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Vol. 948 Number 3

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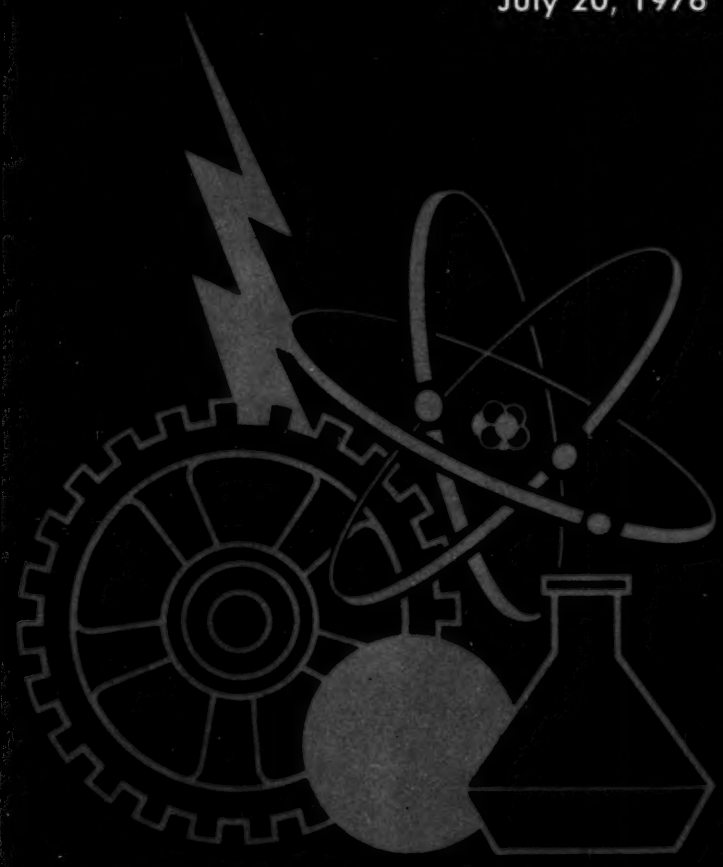
UNITED STATES PATENT AND TRADEMARK OFFICE

PATENTS

July 20, 1976



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Office

OFFICIAL GAZETTE of the UNITED STATES PATENT and TRADEMARK OFFICE

July 20, 1976 Volume 948 Number 3

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PATENT AND TRADEMARK OFFICE NOTICES

Certificate of Mailing of Correspondence

[37 CFR Parts 1, 3 and 4]

Delays in Mail Delivery

Notice is hereby given that, pursuant to the authority contained in section 6 of the Act of July 19, 1952 (66 Stat. 793; 35 U.S.C. 6) as amended on October 5, 1971 (Public Law 92–132, 85 Stat. 364), and in section 41 of the Act of July 5, 1946 (60 Stat. 440; 15 U.S.C. 1123) as amended on January 2, 1975 (Pub. L. 93–596, 88 Stat. 1949) the Patent and Trademark Office proposes to amend Title 37 of the Code of Federal Regulations by adding §§ 1.8, 3.55 and 4.23.

These rule changes are intended to solve, in part, the problems caused by delays in the delivery of papers by mail to the Patent and Trademark Office within the time periods set for response by applicants. A procedure similar to this proposal, dated December 23, 1975 was published in the OFFICIAL GAZETTE on January 20, 1976 at 942 O.G. 1073 for comment. Comments received in response to this proposal have been considered in the preparation of this proposed rule change and will be given further consideration before the promulgation of any rule. A number of changes have been made in the earlier proposal as a result of these comments.

All persons are invited to present their views, objections, recommendations or suggestions relating to the proposed rule changes in writing to the Commissioner of Patents and Trademarks, Washington, D.C. 20231 on or before August 20, 1976. All comments received will be available for public inspection in Room 11E10 of Building 3, at 2021 Jefferson Davis Highway, Arlington, Virginia. No oral hearing will be held.

Comments previously submitted relating to the notice of December 23, 1975 need not be resubmitted since they will again be evaluated along with any comments received directed to these proposed rules.

This proposal has been reviewed pursuant to E.O. 11821 and OMB Circular A–107 and determined to have no major inflationary impact.

The promulgation of the proposed rule change is within the authority granted the Commissioner under 35 U.S.C. 6 since it is "not inconsistent with law" and since it is "for the conduct of proceedings in the Patent and Trademark Office."

Under the proposed rules, generally, where a time is set for taking action in any pending patent or trademark application or in most patent or trademark proceedings pending before the Patent and Trademark Office, correspondence or fees will be considered as being timely filed if (1) deposited with the United States Postal Service within the time set for response, and (2) accompanied by a certificate indicating when the correspondence or fee was so deposited. The person signing the certificate should have reasonable basis to expect that the correspondence would be mailed on or before the date indicated.

The proposed procedure would relate to all actions taken before the Patent and Trademark Office except:

(1) The filing of patent and trademark applications;

(2) The filing of agreements between parties to an interference under 35 U.S.C. 135(c); and

(3) The following requirements of the Trademark Act applying to the registration of a mark;

(i) The filing of an affidavit showing that a mark is still in use or containing an excuse for nonuse under Section 8(a) or (b) or Section 12(c);

(ii) The filing of an application for renewal of a registration under Section 9;

(iii) The filing of a petition to cancel a registration of a mark under Section 14(a) or (b); and

(iv) The filing of an affidavit under Section 15, subsection (3).

The date of deposit in the mails will be considered only to determine the timeliness of the response. The actual date of receipt of the correspondence or fee will continue to be used for all other purposes, such as for example, determining when an appeal brief is due (two months after the receipt of the Notice of Appeal, 37 CFR 1.192).

The proposed addition of a new section 1.8(a) would establish the Certificate of Mailing procedure. Proposed new § 1.8(b) would establish a procedure for situations where correspondence is deposited under § 1.8(a) but is not delivered.

Proposed form § 3.55 is designed for use in patent cases and proposed form § 4,23 is designed for use in trademark cases when making a certificate under § 1.8(a).

It is therefore proposed to amend 37 CFR, Chapter 1, as follows:

PART 1.—RULES OF PRACTICE IN PATENT CASES

1. By adding a new § 1.8 which reads as follows:

§ 1.8 *Certificate of mailing.*

(a) Except in the cases enumerated below, papers and fees required to be filed in the Patent and Trademark Office within a set period of time will be considered as being timely filed if (1) they are addressed to the Commissioner of Patents and Trademarks, Washington, D.C. 20231, and deposited with the United States Postal Service with sufficient postage as first class mail prior to expiration of the set period, and (2) they are accompanied by a certificate stating the date of deposit (see forms §§ 3.55 and 4.23). The actual date of receipt of the paper or fee will be used for all other purposes. This procedure does not apply to the following:

(i) The filing of original or reissue patent applications;

(ii) The filing of trademark application;

(iii) The filing of agreements between parties to an interference under 35 U.S.C. 135(c);

(iv) The filing of an affidavit showing that a mark is still in use or containing an excuse for nonuse under Section 8(a) or (b) or Section 12(c) of the Trademark Act;

(v) The filing of an application for renewal of a mark registration under Section 9 of the Trademark Act;

(vi) The filing of a petition to cancel a registration of a mark under Section 14(a) or (b) of the Trademark Act; and

(vii) The filing of an affidavit under Section 15, subsection (3) of the Trademark Act.

(b) In the event that correspondence or fees are timely mailed in accordance with paragraph (a) of this section, but not received in the Patent and Trademark Office, and the application is held to be abandoned or the proceeding dismissed, terminated, or decided with prejudice, the correspondence or fee will be considered timely if the party who forwarded such correspondence or fee (1) informs the Office of the previous mailing of the correspondence or fee promptly after becoming aware of the Office action, (2) supplies an additional copy of the previously mailed correspondence or fee and certificate, and (3) includes a declaration under 37 CFR 1.68 or 2.20 which attests to the previous timely mailing.

PART 3—FORMS IN PATENT CASES

2. By adding a new § 3.55 which reads as follows.

§ 3.55 *A suggested format for the certificate under 37 CFR 1.8(a) to be included with the correspondence.*

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner of Patents and Trademarks, Washington, D.C. 20231, on

---

Date

Name of applicant, assignee, or Registered Representative

Signature

Date

PART 4—FORMS IN TRADEMARK CASES

3. By adding a new § 4.23 which reads as follows.

§ 4.23 *A suggested format for the certificate under 37 CFR 1.8(a) to be included with the correspondence.*

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner of Patents and Trademarks, Washington, D.C. 20231, on

---

Date

Name of applicant, assignee, or applicant's attorney

Signature

Date

Dated: June 3, 1976.

C. MARSHALL DANN,
Commissioner of Patents and Trademarks.

Approved: June 10, 1976.

BETSY ANCKER-JOHNSON,
Assistant Secretary for Science and Technology.

[FR Doc.76-17963; Filed 6-18-76; 8:45 am]

Patent Suits

Notices under 35 U.S.C. 290; Patent Act of 1952

2,990,094, R. F. Reifers, MOLDED PULP EGG CARTON, **filed** May 26, 1969, D.C. Md. (Baltimore), Doc. 20809-W, *Diamond International Corporation* v. *Maryland Fresh Eggs Inc.* The U.S. Court of Appeals, 4th Circuit, Richmond, Va., reversed the judgment entered July 26, 1974, finding patent valid and infringed. The U.S. Supreme Court denied petition for Writ of Certiorari on 3-1-76. Case is now closed, Mar. 15, 1976. **Same, filed** July 8, 1974, D.C. Del. (Wilmington), Doc. C.A. 74-137, *Diamond International Corporation* v. *Dolco Packaging Corporation, The Dow Chemical Company and Olson Farms, Inc.* Stipulation and order dismissing this action with prejudice, Mar. 5, 1976.

3,076,623, D. G. Lyon, VARIABLE, SHAPED AIRFOIL; **3,127,130**, same, **filed** Feb. 15, 1973, D.C., W.D. Wash. (Seattle), Doc. 119-73c2, *Donald G. Lyon* v. *Boeing Company.* Defendant's motion for summary judgment granted. Defendants' devices do not infringe upon claim of plaintiff's patent, Mar. 10, 1976.

3,127,130. (See 3,076,623.)

3,275,461, Davies and Havranek, REFRACTORY, **filed** Aug. 8, 1969, D.C., N.D. Ohio (Toledo), Doc. C69-613, *Dresser Industries, Incorporated* v. *Eltra Corporation.* Claims 10 and 15 invalid and void. Patent procured by fraud upon Patent Office and as such patent unenforceable, June 11, 1975.

3,503,760, W. M. Allen, METHOD OF SMOKING A COMESTIBLE PRODUCT, **filed** June 6, 1974 D.C., N.D. Ill. (Chicago), Doc. 74c1538, *Beatrice Foods Co.* v. *Bluebird Inc. et al.* Order entered May 20, 1975 by agreement of parties, dismissing cause with prejudice, May 21, 1975.

3,542,214, J. Helms, STACKING AND TRANSMISSION DEVICE FOR PACKAGES, **filed** Aug. 24, 1973, D.C., C.D. Calif. (Los Angeles), Doc. 73-2022-AAH, *Harry Feick Co., Inc.* v. *Entron Controls, Inc. and W. E. Starr and Company.* Stipulation and order re transfer and dismissal. Complaint transferred to the Northern District of Illinois, Eastern Division. Stipulated that cause of action against defendant be dismissed with prejudice and without prejudice to the plaintiff, Dec. 14, 1973. Consent decree attached from D.C., N.D. Ill. (Chicago), Doc. 73c3220 consenting to jurisdiction over litigation, Oct. 23, 1974.

3,563,286, Strobel and Heiser, SAW, **filed** Jan. 20, 1976, D.C., N.D. Ga. (Atlanta), Doc. C76-114A, *Weyerhaeuser Company* v. *North American Products Corp. et al.*

3,583,888, F. G. Shanklin, PACKAGING APPARATUS AND METHOD, **filed** Feb. 10, 1975, United States Court of Appeals, First Circuit, Mass. (Boston), Doc. 75-1061, *Shanklin Corporation* v. *Springfield Photo Mount Company.* The judgment of the District Court is affirmed Aug. 20, 1975.

3,611,910, J. S. Hughes, CORN POPPER, **filed** Jan. 24, 1974, D.C., N.D. Ill. (Chicago), Doc. 74c205, *Ropat Corp.* v. *McGraw Edison Co.* Memorandum opinion and order granting motion of the defendant for summary judgment, May 5, 1975. **Same, filed** Nov. 29, 1974, D.C., N.D. Ill. (Chicago), Doc. 74c3459, *Ropat Corp.* v. *Marshall Field and Co.* Memorandum opinion and order granting motion of the defendant for summary judgment, May 5, 1975.

3,614,757, R. P. Burr, DISPLACING APPARATUS, **filed** May 20, 1975, D.C., C.D. Calif. (Los Angeles), Doc. CV-75-1714-F, *Kollmorgan Corporation* v. *Wangco Inc.*

3,645,463, F. R. Helm, WEB-SPLICING APPARATUS **filed** Oct. 1, 1974, D.C.N.J. (Newark), Doc. C-74-1511, *Champion-Edison, Inc.* v. *Compensating Tension Controls, Inc.* Order of dismissal of action, Mar. 15, 1976.

3,654,382, P. L. Rubright, GROMMET CONSTRUCTION, **filed** Feb. 3, 1975, D.C., E.D. Mich. (Detroit), Doc. 75-70211, *Arco Industries Corp.* v. *Chemcast Corp., C. J. Edwards and Phillip L. Rubright.*

3,658,515, G. A. Saltzman, HARD WEAR-RESISTANT FERROUS ALLOY, **filed** Apr. 25, 1972, D.C., E.D. Wis. (Milwaukee), Doc. 72-C-232, *International Rectifier Corp. and Xaloy Incorporated* v. *Donald P. Lomax.* Plaintiffs' complaint against defendant dismissed without prejudice, Oct. 8, 1974.

3,664,915, W. L. Gore, SEALING MATERIAL, **filed** July 3, 1975, D.C. Del. (Wilmington), Doc. 75-180, *W. L. Gore & Associates, Inc.* v. *Dodge Industries, Inc.*

3,666,854, A. M. Eisentraut, TEST FOR THYROID HORMONE, **filed** Aug. 3, 1973, D.C., S.D. Tex. (Houston), Doc. CA-73-H-1090, *Nuclear Medical Laboratories, Inc.* v. *United Medical Laboratories, Inc.* Consent judgment, plaintiff and defendant have compromised and settled this action without trial and the action is dismissed without award to either party, entered Apr. 16, 1975.

3,671,006, I. L. Berkowitz and Ahrendt, REFRIGERATOR WALL PANELS WITH PANEL FASTENERS AND APPARATUS FOR MAKING SAID PANELS, **filed** Oct. 28, 1975, D.C., N.D. Ill. (Freeport), Doc. 75-0053, *Kason Hardware Corp.* v. *National Lock Hardware Co. and Keystone Consolidated Industries.*

3,676,966, D. Ragland, DOOR-FRAME ASSEMBLY, **filed** Sept. 4, 1974, D.C., S.D. Tex. (Houston), Doc. CA-74-1199, *Ragland Mfg. & Construction Co.* v. *Flexible Walls, Inc.* Stipulated judgment dismissing case with prejudice, Jan. 6, 1975.

3,687,302, M. A. Castro, MACHINE FOR FORMING TIED STACKS OF BALES, **filed** Apr. 22, 1975, D.C., E.D. Calif. (Sacramento), Doc. S-75-293, *Manuel A. Castro* v. *Sperry Rand Corporation.*

3,699,721, G. A. Beasley, GRINDING PAD, **filed** July 23, 1975, D.C., C.D. Calif. (Los Angeles), Doc. 75-2494-FW, *Itek Corporation* v. *Optical Specialties, Inc.*

3,702,076, H. W. Georgi, ELECTRONIC THERMOMETER, **filed** May 30, 1975, D.C., S.D. Calif. (San Diego), Doc. 75-0292-T, *Ivac Corporation* v. *Diatek, Inc.*

3,706,914, G. F. Van Buren, LIGHTING CONTROL SYSTEM, **filed** June 5, 1975, D.C., N.D. Calif. (San Francisco), Doc. C-75-1146-SC, *Van Buren Industries, Inc.* v. *Holzmueller Corporation.*

3,713,368, McDowell and Czernik, ROAD JOINT SEAL AND END DAM CONSTRUCTION, **filed** Sept. 15, 1975, D.C., N.D. Ill. (Chicago), Doc. 75c3063, *Watson-Bowman Associates, Inc.* v. *Felt Products Mfg. Co. et al.*

3,720,264, S. O. Hutchison, HIGH PRESSURE JET WELL CLEANING, **filed** Mar. 12, 1976, D.C., C.D. Calif. (Los Angeles), Doc. 76-810-AAH, *Edwin G. Bemis* v. *Chevron Research Co. and Standard Oil Co. of California.*

PATENT NOTICES

Certificates of Correction for the Week of July 20, 1976

Re. 28,776	3,915,121	3,941,196	3,950,543
Re. 28,790	3,915,437	3,941,692	3,950,551
D. 233,904	3,915,956	3,942,118	3,950,623
D. 239,130	3,916,146	3,942,157	3,950,705
3,288,612	3,916,807	3,942,405	3,950,916
3,431,687	3,918,092	3,942,458	3,950,962
3,550,902	3,918,564	3,942,484	3,951,045
3,679,682	3,919,378	3,942,643	3,951,084
3,711,690	3,920,586	3,942,854	3,951,179
3,807,310	3,920,660	3,942,903	3,951,443
3,817,366	3,920,728	3,943,127	3,951,657
3,819,664	3,920,751	3,943,129	3,951,670
3,821,071	3,920,762	3,943,173	3,951,784
3,821,256	3,922,038	3,943,419	3,951,789
3,822,257	3,922,158	3,943,601	3,952,027
3,830,755	3,922,309	3,943,604	3,952,128
3,835,458	3,922,459	3,944,038	3,952,182
3,839,357	3,923,356	3,944,075	3,952,424
3,839,372	3,923,799	3,944,304	3,952,673
3,842,080	3,923,846	3,944,682	3,952,774
3,843,499	3,923,880	3,944,782	3,952,973
3,845,080	3,923,918	3,944,829	3,953,362
3,847,974	3,924,567	3,945,049	3,953,366
3,850,998	3,925,191	3,945,379	3,953,389
3,856,101	3,926,859	3,945,485	3,953,529
3,858,183	3,927,506	3,945,818	3,953,540
3,864,946	3,928,601	3,945,869	3,953,562
3,866,997	3,928,699	3,945,982	3,953,647
3,871,905	3,930,084	3,946,141	3,953,762
3,872,016	3,930,438	3,946,273	3,953,844
3,872,160	3,931,339	3,946,506	3,954,012
3,876,696	3,932,272	3,946,585	3,954,282
3,882,002	3,932,410	3,946,734	3,954,466
3,883,251	3,932,904	3,946,771	3,954,668
3,883,848	3,933,772	3,947,043	3,954,872
3,885,459	3,934,033	3,947,269	3,954,876
3,890,240	3,934,066	3,947,469	3,954,893
3,891,453	3,934,401	3,947,488	3,954,904
3,891,677	3,934,612	3,947,574	3,955,024
3,893,655	3,935,142	3,947,746	3,955,089
3,893,962	3,935,180	3,947,767	3,955,147
3,898,348	3,935,213	3,947,877	3,955,189
3,898,847	3,935,230	3,947,936	3,955,600
3,900,298	3,935,371	3,948,139	3,955,772
3,900,558	3,935,435	3,948,231	3,955,889
3,901,206	3,936,324	3,948,411	3,955,914
3,902,596	3,936,465	3,948,545	3,955,978
3,902,860	3,936,483	3,948,598	3,955,995
3,906,412	3,936,742	3,948,792	3,956,004
3,906,752	3,937,110	3,948,902	3,956,054
3,907,808	3,937,150	3,948,903	3,956,197
3,907,873	3,937,156	3,948,911	3,956,273
3,910,703	3,937,296	3,948,942	3,956,279
3,912,482	3,938,256	3,949,363	3,956,615
3,912,667	3,938,663	3,949,458	3,956,629
3,912,676	3,939,839	3,949,459	3,957,013
3,912,728	3,939,864	3,949,496	3,957,242
3,912,963	3,939,908	3,949,742	3,957,248
3,912,971	3,940,008	3,949,791	3,957,544
3,913,236	3,940,073	3,949,848	3,957,574
3,914,311	3,941,006	3,949,920	3,958,037
3,914,495	3,941,042	3,950,032	
3,914,925	3,941,126	3,950,318	

Disclaimer and Dedication

3,891,682.—*Robert Ernst*, Los Angeles, and *Eugene J. Miller*, Huntington Beach, Calif. ACYLAMIDOETHOXYETHYL SULFOSUCCINATE SALTS, METHODS OF PRODUCING THE SAME AND FROTH-FORMING COMPOSITIONS CONTAINING THE SAME. Patent dated June 24, 1975. Disclaimer and dedication filed May 11, 1976, by the assignee, *Henkel Inc.*

Hereby disclaims and dedicates to the Public the remaining term of said patent.

Disclaimers

3,506,828.—*David L. Hansen*, Palatine, and *Elizabeth T. Bush*, Chicago, Ill. QUATERNARY AMMONIUM BASES AND LIQUID SCINTILLATION COUNTING SOLVENT. Patent dated Apr. 14, 1970. Disclaimer filed Dec. 23, 1974, by the assignee, *G. D. Searle & Co.*

Hereby enters this disclaimer to claims 1 through 12 of said patent.

3,874,613.—*Otto Zollinger*, Spartanburg, S.C. YARN TENSIONING DEVICE. Patent dated Apr. 1, 1975. Disclaimer filed Apr. 5, 1976, by the assignee, *Otto Zollinger, Inc.*

The term of this patent subsequent to Aug. 21, 1990, has been disclaimed.

3,892,371.—*Otto Zollinger*, Spartanburg, S.C. YARN TENSIONING DEVICE. Patent dated July 1, 1975. Disclaimer filed Apr. 5, 1976, by the assignee, *Otto Zollinger, Inc.*

The term of this patent subsequent to Aug. 21, 1990, has been disclaimed.

3,896,577.—*Norman J. Hayes*, Cody, Wyo. ONE PIECE ANIMAL IDENTIFICATION TAG. Patent dated July 29 1975. Disclaimer filed Apr. 26, 1976, by the assignee, *Y-Tex Corporation.*

Hereby enters this disclaimer to all claims of said patent.

3,914,165.—*Joseph E. Gaske*, Mount Prospect, Ill. RADIATION CURABLE NON-GELLED MICHAEL ADDITION REACTION PRODUCTS. Patent dated Oct. 21, 1975. Disclaimer filed May 18, 1976, by the assignee, *DeSoto, Inc.*

Hereby enters this disclaimer to claims 1–6, 8 and 9 of said patent.

3,925,349.—*Joseph E. Gaske*, Mount Prospect, Ill. RADIATION CURABLE NON-GELLED MICHAEL ADDITION REACTION PRODUCTS. Patent dated Dec. 9, 1975. Disclaimer filed May 18, 1976, by the assignee, *DeSoto, Inc.*

Hereby enters this disclaimer to claims 1–4, 6 and 7 of said patent.

3,955,042.—*Mazin Kellow*, Longueil, *James Vansant*, Chambly, and *Jacques Bonneville*, St-Bruno, Quebec, Canada. COOLING OF POWER CABLES BY A CLOSED - CYCLE EVAPORATION - CONDENSATION PROCESS. Patent dated May 4, 1976. Disclaimer filed May 17, 1976, by the assignee, *Institut de Recherche de l'Hydro-Quebec (IREQ.)*

The term of this patent subsequent to Mar. 23, 1976, has been disclaimed.

3,958,455.—*John D. Russell*, Malibu, Calif. FORCE TRANSDUCER FOR STRAIN GAGE. Patent dated May 25, 1976. Disclaimer filed Apr. 7, 1976, by the inventor.

The term of this patent subsequent to Apr. 13, 1993, has been disclaimed.

Errata

All reference to Patent No. 3,935,342 to Drahoslav Lim for HYDROPHILIZATION OF NON-POLAR SURFACES, appearing in the OFFICIAL GAZETTE of Jan. 27, 1976, should be deleted since no patent should have been granted.

All reference to Patent No. 3,956,286 to William H. W. Lunn of Indiana for PROCESS FOR PRODUCING 7-ACYL-AMIDO-7-ALKOXYCEPHALOSPORINS appearing in the OFFICIAL GAZETTE of May 11, 1976, should be deleted since no patent was granted.

All reference to Patent No. 3,942,213 to Ralph H. Hoener, Jr. for WINDOW WALL WASHING DEVICE FOR HIGH RISE BUILDINGS appearing in the OFFICIAL GAZETTE of Mar. 9, 1976, should be deteled since no patent should have been granted.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF JUNE 19, 1976

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds: Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry: Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	8-8-75
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur: Misc. Esters; Carbohydrates: Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	9-22-75
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	5-16-75
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products: Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	8-4-75
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification: Distillation; Preserving: Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	8-19-75
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization: General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures: Illumination: Horology; Acoustics; Recorders; Weighing Scales.	4-1-75
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	8-22-75
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	6-16-75
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	12-19-75
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	6-16-75
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	3-31-75
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	7-2-75
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus; Plastics Working Apparatus; Plastic Block and Earthenware Apparatus; Machine Tools for Shaping or Dividing: Work and Tool Holders, Woodworking; Tools: Cutlery; Jacks.	11-3-75
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	7-9-75
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	6-25-75
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors: Miscellaneous Hardware; Locks; Building Structures: Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	12-8-75

Expiration of patents: The patents within the range of numbers indicated below expire during July 1976, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,893,005 to 2,897,490 inclusive
Plant Patents..... Numbers 1,850 to 1,855 inclusive

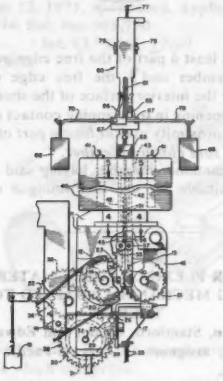
Re. 28,906
CRIMPING APPARATUS WITH HEATING AND COOLING CAGE

Donald W. McKinney, Wilmington, Del., and Henry A. Sinski, Aldan, Pa., assignors to Indian Head Inc., New York, N.Y.

Original No. 3,587,145, dated June 28, 1971, Ser. No. 834,792, June 19, 1969. Application for reissue June 6, 1975, Ser. No. 584,288

Int. Cl.² D02G *1/12*

U.S. Cl. 28—1.7 **28 Claims**



1. Yarn crimping apparatus comprising walls forming a confined crimping chamber, feed rolls disposed to feed yarn for crimping into one end of said chamber, a housing forming a heating and setting chamber registering with said crimping chamber, a cage having a set of spaced parallel rods disposed around the periphery of said heating chamber with their inner surfaces forming a continuation of the walls of said crimping chamber and extending throughout the length of said heating chamber for confining and guiding the core of crimped yarn therethrough, means securing said rods as a unit to form said cage.

Re. 28,907
SELF-TAPPING THREADED BUSHINGS

Carl B. H. Eibes, deceased, late of Schnalttenback, Germany; by Ursula Eibes, nee Waschau and Christian Eibes, both of Dr. Carl-Eibes-Str. 11, Schnaittenback, Germany; Carl-Herwig Eibes, Grunewaldstra. 30, Berlin-Schoneberg, Germany, and Maria-Theresia Wagner, nee Eibes, Hans Klopferweb Nr. 1, Amberg, Germany, all legal heirs

Original No. 3,866,510, dated Feb. 18, 1975, Ser. No. 329,952, Feb. 5, 1973. Continuation of Ser. No. 125,260, March 17, 1971, abandoned, which is a division of Ser. No. 733,562, May 13, 1968, Pat. No. 3,597,781. Application for reissue July 3, 1975, Ser. No. 593,404

Claims priority, application Germany, June 5, 1967, 62476

Int. Cl.² F16B *25/00*

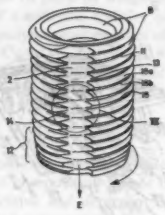
U.S. Cl. 85—47 **3 Claims**

1. A threaded self-tapping bushing adapted to be secured to a work piece and comprising,

an elongate member having helical male threads extending over at least a portion of its axial length, said threads having crests, roots between said crests, and flanks extending from said crests to said roots on either side of said crests;

said member having at least one axially extending bevel intersecting a plurality of successive threads,

the crests and flanks of each said male thread at their intersection with said bevel defining frontal areas on either side of said bevel which are concave both along the circumferential direction of each said male thread and transversely thereto along the axial direction of the bushing,



each said bevel being approximately as deep as the roots between the crests to ensure that the roots between successive crests are essentially discontinuous at each beveled portion, each said frontal area providing cutting edges along at least a part of its periphery as defined by said crest, flanks, and bevel,

one of the two said frontal areas formed at the junction of each said male thread with said bevel having a greater curvature than the other.

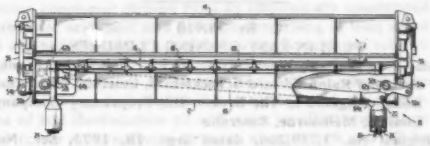
Re. 28,908
FLUID ACTUATED PRESS

John Calvin Jureit, Coral Gables, Fla., assignor to Automated Building Components, Inc., Miami, Fla.

Original No. 3,750,562, dated Aug. 7, 1973, Ser. No. 190,724, Oct. 20, 1971. Application for reissue Mar. 28, 1975, Ser. No. 563,059

Int. Cl.² B30B *1/32*

U.S. Cl. 100—100 **10 Claims**



1. A press comprising: a base structure including a press platen, a head including a press platen in opposition to said first mentioned press platen, means connecting said head and said base structure for reciprocating movement of said head relative to said base structure including a fluid actuated cylinder connected between said head and said base structure at each of the opposite ends of said press, and means coupled between opposite ends of said press for transferring a portion of the force applied by the cylinder to said head at one end of said press to the head at the opposite end of said press, said coupling means including a bellcrank at opposite ends of said press, said bellcranks being pivotally carried by said base structure, a transfer bar interconnecting said bellcranks, a rod coupled between said bellcrank and said head at opposite ends of the press, said rods, bellcranks, and transfer bar being arranged such that rotation of one of said bellcranks in re-

sponse to movement of said head toward said base rotates the other bellcrank in an opposite direction, the rod at one press end being subject to compressive forces and the rod at the other press end being subject to tensile forces in response to asymmetrical press loadings.

Re. 28,909

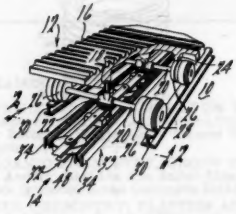
CONVEYOR

Dimitry Holbert, Birmingham, Mich., assignor to Standard Alliance Industries, Inc., Chicago, Ill.

Original No. 3,678,861, dated July 25, 1972, Ser. No. 63,392, Aug. 13, 1970. Application for reissue July 18, 1974, Ser. No. 489,798

Int. Cl.² B61B *13/00*

U.S. Cl. 104—172 B **12 Claims**



6. In a conveyor chain assembly, a chain comprising connected pairs of spaced links; curved guide rails on opposite sides of said chain; a plurality of rollers carried by pins connecting said pairs of links and engageable with said guide rails as said chain passes therebetween, whereby intermediate portions of said links between said rollers approach relatively closely to said guide rails; and means for driving said chain comprising a plurality of blocks spaced along the length of said chain, each block being disposed between and attached to the links of a pair of said chain links and having planar surfaces extending laterally outwardly in opposite directions from said links, said rollers following and being disposed adjacent to but spaced from respective of said blocks, the lateral extent of said surfaces being less than that which will cause engagement of said blocks with said guide rails during operation of said chain assembly, and a driving apparatus having pairs of forked driving dogs movable into position on opposite sides of said chain, said dogs having lateral planar surfaces engageable with the lateral surfaces of said blocks.

Re. 28,910

PUSH-IN EASY-OPENING CLOSURES

Alan George Dalli, Warrandyte; Michael Debenham, Frankston, and Ralph Edward Schackleford, Emerald, all of Australia, assignors to The Broken Hill Proprietary Company Limited, Melbourne, Australia

Original No. 3,759,206, dated Sept. 18, 1973, Ser. No. 180,785, Sept. 15, 1971. Application for reissue Apr. 4, 1975, Ser. No. 565,078

Claims priority, application Australia, Sept. 16, 1970, 2556/70

Int. Cl.² B21D *51/00*

U.S. Cl. 113—121 C **20 Claims**

1. A method of forming an easy-opening, *push-in* closure in a sheet metal container member, said method comprising:

forming a bulge in an area of the sheet metal container member,

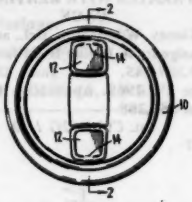
at least partially severing a portion of the sheet metal in said area to provide a free edge,

wherein at least a portion of said bulge lies substantially outside of said portion,

the free edge of the sheet metal from which said portion is at least partially severed defining an opening, and said severed portion defining a closure member for said opening,

wherein said bulge includes an approximately flat area of sheet metal that is generally parallel to the plane of the sheet metal surrounding said bulge, said severing being carried out substantially within said flat area,

thereafter reducing the size of said opening by at least partly flattening said bulge,



to place [at least á part of the free edge portion of said closure member and] the free edge defining said opening or the interior surface of the sheet metal adjacent said opening in overlapping contact or in overlapping close proximity *over at least a part of the free edge portion of said closure member,*

whereby said container member having said easy-opening closure is suitable for use in forming a container for liquids.

Re. 28,911

DISPENSER FOR FLEXIBLE SHEET MATERIAL AND A PERFORATING MECHANISM ADAPTED TO BE USED THEREIN

Paul W. Jespersen, Stamford, Conn., and Edward L. Bump, Oak Park, Ill., assignors to Georgia-Pacific Corporation, Portland, Oreg.

Original No. 3,739,965, dated June 19, 1973, Ser. No. 104,415, Jan. 6, 1971. Division of Ser. No. 793,808, Jan. 24, 1969, Pat. No. 3,575,328. Application for reissue Sept. 30, 1974, Ser. No. 510,780

Int. Cl.² B26F *3/02*

U.S. Cl. 225—96 **11 Claims**

10. In a dispenser for flexible sheet material including, a chassis adapted to be attached to a wall, means operatively connected to said chassis for rotatably supporting a roll of flexible sheet material, means operatively connected to said chassis for guiding a web of flexible sheet material from said roll to a position to be grasped by a user so that the user may pull the web out of the dispenser, a perforating mechanism operatively connected to said chassis for perforating said web at intervals therealong to divide the web into individual sheets, said perforating mechanism including a rotatably mounted knife-receiving roller, a rotatably mounted knife positioned adjacent said knife-receiving roller and having a radially outward portion defining a cutting edge for perforating the web as the web passes between the knife-receiving roller and the knife, said knife-receiving roller being operatively connected to said knife for synchronous rotation therewith and having a slot therein for receiving said radially outward knife portion as the knife rotates past the roller, and a stop mechanism associated with said perforating mechanism for stopping the rotation of said knife and said roller and thus arresting the movement of the web after a predetermined length of the web has been withdrawn from the dispenser; the improvement wherein said guiding means comprises a rotatably mounted upper pinch roll positioned adjacent said knife-receiving roller and spaced from said knife in the direction opposite to the normal direction of movement of the web through the dispenser, a rotatably mounted lower pinch roll positioned adjacent said knife-receiving roller and spaced from said knife in the direction of the normal direction of movement of the web through the dispenser, said lower pinch roll also being movable toward and away from said knife-receiving roller, and biasing means for urging said lower pinch roll toward said knife-receiving roller, whereby the lower pinch roll moves away from said

knife-receiving roller against the urging of the biasing means when a user initially pulls on the web so that the web is pulled tautly against the knife-receiving roller, and the upper and lower pinch rolls cooperate with the knife-receiving roller when the knife and knife-receiving roller are rotated to insure that the web is held tautly about the knife-receiving roller.

Re. 28,912

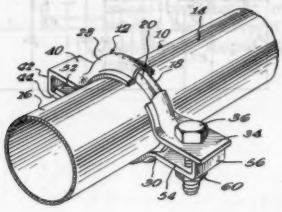
EMISSION-FREE EXHAUST PIPE JOINT AND CLAMP THEREFOR

Bertil Stade, Wood Dale, and Edward Hoglund, Park Ridge, both of Ill., assignors to Mercury Metal Products, Inc., Schaumburg, Ill.

Original No. 3,788,677, dated Jan. 29, 1974, Ser. No. 236,364, Mar. 20, 1972. Continuation-in-part of Ser. No. 142,977, May 13, 1971, abandoned. Application for reissue Sept. 13, 1974, Ser. No. 505,750

Int. Cl.[2] F16L *17/00*

U.S. Cl. 285—367 **17 Claims**



1. A clamped joint for use in internal combustion engine exhaust systems which comprises:

A. a joint formed of a pair of pipes, each pipe having a bead formation at an end thereof, the bead formations including respective axially facing flange surfaces and the flange surfaces being substantially abutted face to face,

B. a pipe clamp engaged over the bead formations and constricted thereon, the clamp having radially inwardly facing groove means along its inner surface with opposite [surfaces] *areas of said inner surface* of the groove means engaging the bead formations and applying wedging forces on said bead means causing the flange surfaces to be forced axially together,

C. the clamp being formed of two generally semi-circular halves, each half having a substantially radially outwardly extending tongue on one end thereof with the tongues spaced apart and having cooperating fastening means for bringing the tongues together in securing the clamp to the joint, each half having a medial section provided with said groove means, and the second end of each half having cooperating formations providing a separable hinge connection thereat,

D. said cooperating formations comprising an open bight on one of said second ends and a tab on the other of said second ends, the tab lying in the bight engaged against one side of said bight in surface engagement, [only],

E. said bight being generally rectangular in configuration and having a pair of planar portions spaced apart, one planar portion extending substantially radially outwardly of the clamp and the other being parallel thereto, a bridge connecting the planar portions, said other planar portion having a free end, the said tab extending substantially radially outwardly of the clamp and being disposed in facing engagement with the inside of said other planar portion,

F. said tongues having aligned perforations and said fastening means comprising a bolt extending through said perforations generally tangential to said clamp, one of said tongues having a right angle bent flange adapted to limit movement of the tongues toward one another.

Re. 28,913

MILDNESS ADDITIVE

Ralph Kelly, Cincinnati, and Edmond Jean Ritter, Loveland, both of Ohio, assignors to Cincinnati Milacron, Inc., Cincinnati, Ohio

Original No. 3,630,934, dated Dec. 28, 1971, Ser. No. 696,509, Jan. 9, 1968. Continuation-in-part of Ser. No. 613,095, Feb. 1, 1967, Pat. No. 3,538,009. Application for reissue Sept. 17, 1974, Ser. No. 506,723

Int. Cl.[2] C11D *1/62, 1/66, 3/20*

U.S. Cl. 252—547 **12 Claims**

1. A detergent composition consisting essentially of a skin irritating detergent selected from the group consisting of [anionic] cationic, non-ionic, and amphoteric organic detergents and .005 to 10 parts by weight based on said skin irritating detergent of a mildness additive comprising

(I) the substituted polymerized product of 2 to 4 molecules of a monomeric C_{12} to C_{26} fatty acid, wherein said product contains a cyclohexene moiety and instead of 2 to 4 carboxyl groups from said fatty acid, hydroxy or hydroxy methyl groups; or

(II) the substituted saturated polymerized product defined in (I);

said detergent composition exhibiting reduced skin irritation compared to the same composition absent the mildness additive; the mildness additive and detergent composition being stable and compatible in aqueous media.

Re. 28,914

TREATMENT OF A CELLULOSIC-CONTAINING TEXTILE WITH A FLUOROCARBON, AN AMINOPLAST, AND A SYNTHETIC ACID COPOLYMER, AND TEXTILE OBTAINED THEREFROM

Francis W. Marco, Spartanburg, S.C., assignor to Deering Milliken Research Corporation, Spartanburg, S.C.

Original No. 3,597,145, dated Aug. 3, 1971, Ser. No. 622,086, Mar. 10, 1967. Application for reissue July 11, 1972, Ser. No. 270,784

The portion of the term of the patent subsequent to Apr. 9, 1985, has been disclaimed.

Int. Cl.[2] D06M *15/58; 15/54*

U.S. Cl. 428—272 **22 Claims**

1. A process for imparting oil and water repellency, soil release and durable press characteristics to a cellulosic-containing textile material which comprises applying thereto an aminoplast textile resin; a textile resin catalyst, a fluorocarbon oil and water repellent material, and a synthetic acid soil release copolymer derived from an ethylenically unsaturated carboxylic acid, said acid polymer comprising at least about 20 weight percent acid calculated as acrylic acid; and subjecting said textile material to textile resin curing conditions at a temperature between about 100° and 200° C., whereby the textile resin is crosslinked to the textile material, the proportion of said fluorocarbon oil and water repellent material on said textile material being between about 0.01% and 5% by weight based on the dry weight of the textile material and the proportion of said acid polymer on said textile material being between at ut 0.25% and 5% by weight based on the dry weight of the textile material.

17. In a process for improving the soil release properties of a textile material wherein the textile material is impregnated with a composition including a durable press textile reactant selected from water-soluble precondensates of formaldehyde with amino compounds and a water-insoluble acrylic hydrophilic polymer which absorbs about seven times its weight of water when immersed in an aqueous detergent solution for 2 minutes at 140° F., said polymer being an addition polymer of at least one ethylenically unsaturated monomer having one or more acid groups, and then drying and curing, the improvement which comprises applying said durable press reactant and hydrophilic polymer to said textile in a stable aqueous mixture with an oil and water repellent fluoro-acrylic polymer characterized by (CF_2) *groups and a terminal* CF_3 *group, the amount of fluoro-acrylic polymer*

being in the range of 4-100 based on the weight of said hydrophilic polymer, the proportion of said fluoro-acrylic polymer on said textile material being between about 0.01 and 5 by weight based on the dry weight of the textile material and the proportion of said acrylic hydrophilic polymer on said textile material being between about 0.25 and 5 by weight based on the dry weight of the textile material.

22. A durable press textile having improved soil release properties, said textile being finished with a cured durable press and soil release finish consisting essentially of a mixture of durable press reactant selected from water-soluble precondensates of formaldehyde with amino compounds and a water-insoluble acrylic hydrophilic polymer which absorbs about seven times its weight of water when immersed in an aqueous detergent solution for 2 minutes at 140° F., said polymer being an addition polymer of at least one ethylenically unsaturated monomer having one or more acid groups, and oil and water repellent fluoro-acrylic polymer characterized by (CF_2) groups and a terminal CF_3 group, the amount of fluoro-acrylic polymer being in the range of 4–100 based on the weight of hydrophilic polymer, the proportion of said fluoro-acrylic polymer on said textile material being between about 0.01 and 5 by weight based on the dry weight of the textile material and the proportion of said acrylic hydrophilic polymer on said textile material being between about 0.25 and 5 by weight based on the dry weight of the textile material.

Re. 28,915

DETECTION OF PRODUCTS OF COMBUSTION

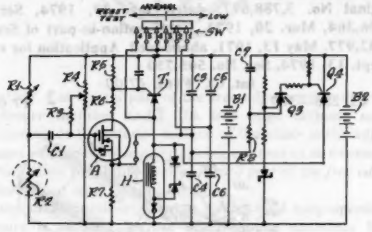
Wilbur L. Ogden, Aurora, and Clarence Glenn Henderson, Ottawa, both of Ill., assignors to BRK Shareholders' Committee

Original No. 3,594,751, dated July 20, 1971, Ser. No. 709,415, Feb. 29, 1968. Application for reissue July 13, 1973, Ser. No. 378,997

Int. Cl.² G08B *17/10*

U.S. Cl. 340—237 S **40 Claims**

1. In a warning device having a primary power source, an alarm unit connected to said source and a load unit connected to said source; a supervisory circuit comprising a secondary power source, a capacitor in series with said secondary source, means coupling said capacitor to one side and said secondary source to the other side of said load unit to sense the voltage drop thereacross, trigger means responsive upon charging of said capacitor for connecting said alarm unit with said secondary source, said capacitor being charged by said second



source when the voltage drop across said load unit falls below a predetermined value and when charged triggering said trigger means, said trigger means during discharge of said capacitor causing said secondary source to energize said alarm unit [whereby the alarm unit,] whereby the alarm unit emits periodic alarms of short duration when the output of the primary source falls below a predetermined value.

PLANT PATENTS

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

GRANTED JULY 20, 1976

3,937
ROSE PLANT
William A. Warriner, Tustin, Calif., assignor to
Jackson & Perkins Company, Medford, Oreg.
Filed Apr. 30, 1975, Ser. No. 573,060
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—29 1 Claim

1. A new and distinct cultivar of rose plant of the floribunda class, substantially as herein shown and described, characterized particularly as to novelty by the unique combination of its vigorous growth, dark red, pointed buds, Currant Red open flowers, with a white base, apple shaped receptacle, and long oval pointed leaflets.

PATENTS

GRANTED JULY 20, 1976

ERRATA

For CLASS	See PATENT NO.
051–141	3,969,848
051–268	3,969,856
073–139	3,970,155
062–028	3,970,441
426–237	3,970,530
526–012	3,970,603
526–260	3,970,606
526–335	3,970,607
526–019	3,970,608
526–089	3,970,609
526–062	3,970,610
526–065	3,970,611
526–086	3,970,612
526–104	3,970,613
536–017	3,970,641
536–017	3,970,642
536–017	3,970,643
340–147 TF	3,971,037
340–147 TF	3,971,038
335–284	3,971,054

PATENTS

GRANTED JULY 20, 1976

ERRATA

Pat. Class	Pat. No.
051-141	[illegible]
051-258	3,969,858
073-139	3,969,856
062-028	3,970,155
420-127	3,970,141
526-012	3,970,530
526-260	3,970,602
526-333	3,970,606
526-019	3,970,607
526-089	3,970,608
526-062	3,970,609
526-065	3,970,610
526-080	3,970,611
526-104	3,970,612
526-012	3,970,613
526-012	3,970,641
526-012	3,970,642
340-147 TP	3,970,643
340-147 TP	3,971,017
125-284	3,971,038

PATENTS

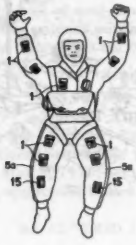
GRANTED JULY 20, 1976

GENERAL AND MECHANICAL

3,969,772
JUMPING GARMENT FOR A PARACHUTIST

Marcel Pravaz, Clichy, France, assignor to Etudes et Fabrications Aeronautiques, Paris, France

Filed Dec. 11, 1974, Ser. No. 531,668
Claims priority, application France, Dec. 19, 1973, 73.45483
Int. Cl.² A41D *13/02*
U.S. Cl. 2—79 15 Claims



1. In a sky diving garment having sleeves and legs for a parachutist and defining a flexible wall exposed to the air about at least a part of the body including the arms and legs of the parachutist; the improvement comprising means for inflating the garment and thereby increasing the drag during the diving, said means comprising air entry openings which are in regions of the garment wall including a region of each sleeve and a region of each leg of the garment and defined by the wall of the garment and facing away from the parachutist/-transversely of the parachutist to permit entry of air directly into a space defined about the body of the parachutist by the wall of the garment so as to inflate the garment as the parachutist falls through the air in a substantially horizontal orientation.

3,969,773
PROSTHETIC KNEE JOINT FOR ATTACHMENT TO A NATURAL OR PROSTHETIC LEG

Alfred Menschik, Donaueschingenstrasse 13,, A 1200 Vienna, Austria

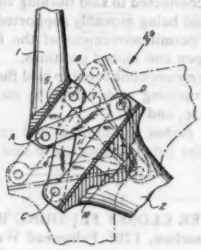
Filed Aug. 22, 1974, Ser. No. 499,565
Claims priority, application Austria, Aug. 24, 1973, 7405/73; Germany, July 8, 1974, 2432766
Int. Cl.² A61F *1/24, 1/04, 1/08*
U.S. Cl. 3—1.911 14 Claims

1. A prosthetic knee joint comprising:

a femur-engaging upper base;

a tibia-engaging lower base; and

an inextensible and incompressible coupling including at least two rigid members positively interconnecting said bases, said coupling facilitating a swinging of said lower base relative to said upper base in a vertical plane between a front limiting position and a rear limiting position, the respective distances of a more forwardly located first point A and a more rearwardly located second point B on said upper base from a more rearwardly located third point D and from a more forwardly located fourth point C on said lower base being substantially constant throughout the swing range; the distance A–B of said first and second points, the distance C–D of said third and fourth points, the distance A–D of said first and

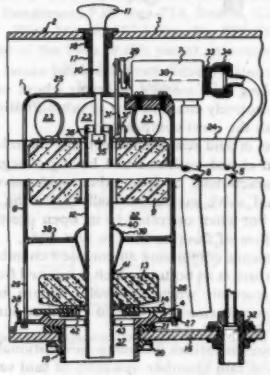


points, and the distance B–C of said second and fourth points being interrelated in a ratio of substantially 2:5:4:5.

3,969,774
FLUSHING AND REFILLING APPARATUS

Frans Harry Karlsson, Lund, Sweden, assignor to Hykon-Patent Aktiebolag, Sweden

Filed Dec. 12, 1974, Ser. No. 532,148
Claims priority, application Sweden, Dec. 12, 1973, 7316759
Int. Cl.² E03D *1/30*
U.S. Cl. 4—41 12 Claims



1. A cistern flush and refill system comprising a cistern provided with an upper wall and a discharge opening in its bottom wall and an inlet connected to a source of liquid under pressure, said system further comprising,

a flushing valve seat forming a passage between a lower part of the cistern and said discharge opening,

an assembly comprising as assembled parts a common support, a refilling valve, a flushing valve and an overflow pipe,

manually-operable coupling means for connecting said common support to said cistern and for permitting easily detachable connection of said common support to said cistern,

said refilling valve mounted on said common support and having means for detachably connecting said refilling valve to said inlet,

said flushing valve being movable between an open position and a closed position where it closes said flushing valve seat,

seat overflow pipe communicating between said flushing valve seat and an upper level of said cistern, said overflow pipe being connected to said flushing valve for movement therewith and being movably supported on said common support to permit movement of the flushing valve between its open and closed positions,

valve opening means connected to said flushing and refilling valves for opening said valves to start a flushing and refilling cycle, and

valve closing means for closing said refilling valve, said closing means being connected to said refilling valve.

3,969,775

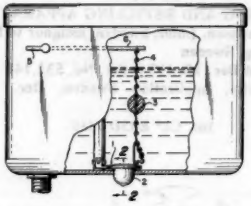
WATER CLOSET FLUSHING DEVICE

Frederick R. Haselton, 1205 Fallsmead Way, Rockville, Md. 20850

Continuation of Ser. No. 421,599, Dec. 4, 1973. This application Jan. 6, 1975, Ser. No. 538,617

Int. Cl.² E03D *1/34, 5/02;* **A61B** *19/00*

U.S. Cl. 4—67 A **2 Claims**



1. A flush control mechanism for a water closet of the type having a flushing fluid storage reservoir whose contents are transferred selectively either in part or substantially entirely to a bowl to flush the bowl comprising:

valve means in said reservoir selectively operable between open and closed positions and having a negative buoyancy characteristic at least when said valve means is open, said valve means normally assuming the closed position but when operated to its open position permitting the flow of flushing fluid to said bowl,

said valve means comprising an enclosed chamber having a vent aperture at its bottom which is isolated from the fluid in said reservoir when said valve means is closed to thereby permit emptying of said chamber during closure of said valve means,

said valve means further including an additional fluid entry aperture in said chamber upwardly of said vent aperture for permitting entry of fluid into said chamber only when said valve means is opened,

whereby said chamber has positive buoyancy when said valve means is closed but quickly becomes flooded and acquires negative buoyancy upon opening of said valve means,

a manually operated means operable between a first normal position and a second flushing position,

and means responsive to a momentary actuation of said manually operated means to its second position for opening said valve means only until a predetermined portion of the fluid in said reservoir which is less than the full quantity thereof has been transferred to said bowl,

said last-named means being responsive to a continued actuation of said manually operated means to its second position to maintain said valve means in its open position as long as said manually operated means remains in its said second position to permit transfer of substantially all of the fluid in said reservoir to said bowl.

3,969,776

WATER LOUNGE

Robert Gildea, 2213 Ogletown Road, Newark, Del. 19711

Filed July 31, 1975, Ser. No. 600,631

Int. Cl.² E04H *3/16, 3/18;* **F16L** *21/02*

U.S. Cl. 4—172 **10 Claims**

1. A water lounge comprising a generally rectangular shaped impervious body portion including a bottom wall with front, back and side walls extending upwardly therefrom adapted to hold water, a pair of spaced apart wheels rotatably secured to the body portion near the back wall thereof, an adjustable backrest within the body portion also near the back wall thereof, a drain in the bottom wall of the body portion, and at least one prop externally thereof and extending downwardly from the body portion near the front wall thereof for maintaining the body portion generally level.

3,969,777

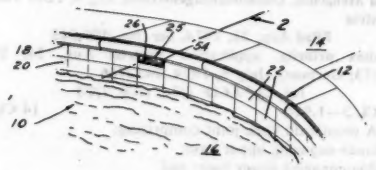
OVERFLOW-SIPHONING DEVICE FOR SWIMMING POOLS AND THE LIKE

Sidney J. Beller, 20500 Miranda Place, Woodland Hills, Calif. 91364

Filed Feb. 24, 1975, Ser. No. 552,272

Int. Cl.² E04H *3/20*

U.S. Cl. 4—172.17 **2 Claims**



1. An overflow-siphoning device for controlling the water level of a swimming pool or the like body of water, the device being adapted for installation beneath the coping thereof to provide a continuous discharge of excess water from the pool separate from the pool recirculating system, wherein the device comprises:

a tubular conduit being disposed between said coping and said peripheral edge of said pool, wherein said peripheral edge of said pool is provided with a channel transversely disposed thereto in which said tubular conduit is fixedly received, said conduit having:

a substantially-flat, elongated mouth defining the inlet thereof;

a throat portion having a substantially-flat, upper wall, a pair of converging side walls, and a lower wall inclined downwardly and rearwardly of said mouth inlet;

a circumferential duct portion defining the outlet thereof; said mouth inlet is further defined as including: an elongated, leading edge of said upper, flat wall; an elongated, leading edge of said lower inclined wall; and a pair of oppositely-arranged, vertical, leading edges of said side walls, and wherein all of said walls are integrally formed and converge rearwardly to form said circular duct, thereby allowing the water in said pool to be discharged therethrough;

and said transverse channel includes a bottom wall being inclined downwardly and rearwardly, conforming to said lower inclined wall of said throat portion, and wherein said duct portion extends outwardly therefrom, said duct being disposed below said deck.

3,969,778

TOILET AIDS

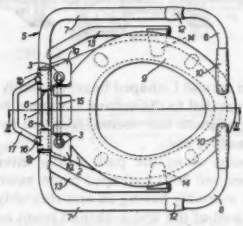
Derek John Richards, Longhope, England, assignor to Mecanaids Limited, Great Britain

Filed May 8, 1975, Ser. No. 575,695

Claims priority, application United Kingdom, May 18, 1974, 22286/74

Int. Cl.² E03D *11/00*

U.S. Cl. 4—254 **11 Claims**



1. A toilet aid constructed for attachment to a W.C. pan, using the normal seat-attachment bolt holes provided in the pan, with support arms which extend forwardly on each side of a user when seated and which have inturned end portions connected thereto to provide front support for the user, at least the end portions of the arms being movable to the side to a front entry position which permits free entry and exit between the arms with main side portions of the arms positioned to assist the user when manoeuvring into and out of the seated position.

3,969,779

DYEING AND PRINTING OF MATERIALS

William H. Stewart, Jr., Spartanburg, S.C., assignor to Deering Milliken Research Corporation, Spartanburg, S.C.

Filed July 30, 1974, Ser. No. 493,187

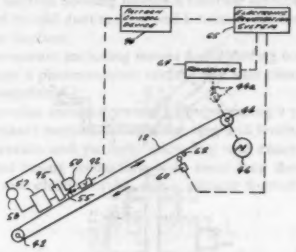
Int. Cl.² D06B *1/02*

U.S. Cl. 8—149 **15 Claims**

1. A method of dyeing a porous textile material, in particular pile fabrics and carpets, to obtain a desired pattern thereon with apparatus including conveying means for transporting the textile material past at least one row of jet orifices extending across the path of the textile material, deflecting means associated with said jet orifices, pattern control means to supply pattern data to control the operation of said deflecting means, and said pattern control means including timing means; said method comprising the steps of

1. transmitting pattern data from said pattern control means to said deflecting means in a multiplicity of repeating cycles (E-E) so that continuous dye streams from the jet orifices are directed onto or away from the textile material as required to form a single pattern,

2. initiating each of said cycles in response to movement of the textile material through a predetermined, preselected incremental distance,



3. directing one or more of the dye streams onto the textile material during one or more time controlled segments (C) of preselected duration within a fixed time period (T) in selected cycles in accordance with said pattern data and the operation of said timing means, and

4. maintaining within each cycle a quiescent time (Q) during which all of said dye streams in the row are directed away from the textile material.

3,969,780

CONTINUOUS CARPET DYEING PROCESS

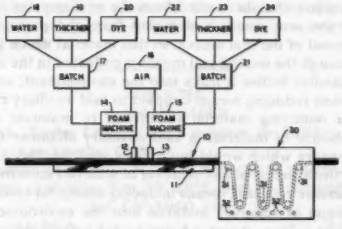
James M. Henderson, P.O. Box 773, Dalton, Ga. 30720

Filed May 4, 1972, Ser. No. 250,298

The portion of the term of this patent subsequent to July 20, 1991, has been disclaimed.

Int. Cl.² D06B *1/02*

U.S. Cl. 8—149.1 **19 Claims**



1. A process for use in dyeing material, such as carpet, including:

a. advancing a length of material to be dyed along a predetermined path;

b. applying a foam mixture containing dye material to one side of the length of material moving along said predetermined path;

c. applying a vacuum to the side of the length of material opposite to the side thereof to which the foam mixture is applied; and

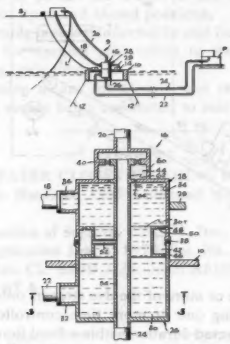
d. fixing said dye material to said length of material.

3,969,781

MOORING AND CARGO TRANSFER SYSTEM FOR DIFFICULT HANDLING CARGO

William R. Reid, Jr., Northridge, Calif., assignor to Imodco, Inc., Los Angeles, Calif.

Filed Aug. 27, 1973, Ser. No. 392,037
Int. Cl.² B63B *21/52*; B65B *3/04*
U.S. Cl. 9—8 P **5 Claims**



1. In a mooring and cargo handling system which includes a mooring station to which ships can be moored that are free to drift about the station, a first cargo conduit leading to a shorebased or other primary installation, and a second cargo conduit leading to the ship, the improvement comprising:

a swivel unit attached to the mooring station and having first and second swivel sections with passages therein, said swivel sections rotatably joined about a primarily vertical axis and with their passages coupled to each other, the passages of said first and second sections respectively coupled to the first and second cargo conduits that lead to the primary installation and to the ship;

said swivel unit having a pair of rotatable seal means between the swivel sections, and having walls defining an auxiliary chamber sealed from the environment by a first of the seal means and sealed from the passages by a second of the seal means, so that material which can leak through the second seal means is collected in the auxiliary chamber before it leaks into the environment; and

pressure reducing means coupled to said auxiliary chamber for removing material therefrom, to maintain a lower pressure of material in said auxiliary chamber than the pressure which would build up in said auxiliary chamber in the absence of any removal of material therefrom, said pressure reducing means including means for resisting the escape of removed material into the environment, and said auxiliary chamber being sealed against the inflow of material therein to prevent material inflow except for any material which leaks through the seal means about the chamber.

3,969,782

TWO BRUSH VEHICLE COORDINATED AUTOMATIC WASHER

Robert D. Williams, 4338 Oakwood, La Canada, Calif. 91011

Filed May 16, 1974, Ser. No. 470,441
Int. Cl.² B60S *3/06*
U.S. Cl. 15—53 AB **11 Claims**

1. In a vehicle wash apparatus having a vehicle path therethrough, an improvement comprising:

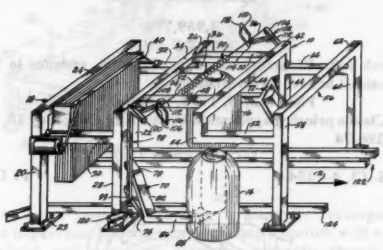
a. a unitary frame including:

i. a first arch having a pair of spaced-apart vertical posts straddling the path and a beam bridging the path and connecting the posts;

ii. a first L-shaped beam assembly adjacent to the first arch, and spaced from and parallel to the first arch, the L-shaped beam assembly having a vertical post to a first side of the path and a horizontal beam over the path;

iii. a second L-shaped beam assembly adjacent to the first L-shaped beam assembly and spaced from and parallel to the first beam assembly on the opposite side thereof from the first arch, the second L-shaped beam assembly having a vertical post to a second side of the path, the second side being opposite the first side, and a horizontal beam over the path;

iv. a second arch having a pair of spaced-apart vertical posts straddling the path and a beam bridging the path and connecting the posts, the second arch being adjacent to the second L-shaped beam assembly and spaced from and parallel to the second L-shaped beam assembly on the opposite side thereof from the first L-shaped beam assembly; and



v. beam means along the path rigidly interconnecting both arches and both L-shaped beam assemblies;

b. a first brush assembly having an arm rotatably secured to the vertical post of the first L-shaped beam assembly and an arc of rotation which intersects an imaginary line below the distal end of the horizontal beam of the second L-shaped beam assembly;

c. a second brush assembly having an arm rotatably secured to the vertical post of the second L-shaped beam assembly and an arc of rotation which intersects an imaginary line below the distal end of the horizontal beam of the first L-shaped beam assembly; and

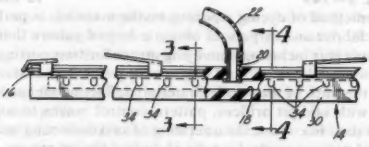
d. means for coordinating brush movement in response to vehicle movement along the path.

3,969,783

COMBINATION WINDSHIELD WASHER/WIPER

William A. Shipman, 6 Eastshore Blvd., Timberlake, Ohio 44094

Filed June 4, 1975, Ser. No. 583,642
Int. Cl.² B60S *1/46*
U.S. Cl. 15—250.04 **1 Claim**



1. The combination of windshield washing and wiping blade and a fluid supply reservoir assembly comprising,

an elongated blade of elastomeric material having means for securement thereof to a wiper arm,

a hollow central portion thereof extending longitudinally therealong,

said blade being generally triangular in cross-section,

through openings formed in said blade member on the two legs that normally contact the windshield surface for communication with said hollow central portion,

said openings being a plurality of generally "u" shaped slots, said slots being formed such that they are normally closed when the material is in the unstressed condition to prevent leakage therefrom and open when stressed in tension to allow fluid to pass therethrough and be dispensed in a "u" shaped pattern,

flexible tube means,

means to secure one end of said tube means to said blade in communication with said hollow central portion of the blade,

a fluid reservoir connected to the opposite end of said flexible tube, and means to selectively pump fluid from said reservoir through said tube to the hollow central portion of said blade.

3,969,784

PRESSION SECTOR WINDSCREEN-WIPER BLADE FOR MOTOR VEHICLES

Paul Journée, Chateau de Reilly, 60 Reilly par Chaumont-en-Vexin, France

Filed Jan. 30, 1975, Ser. No. 545,383

Claims priority, application France, Jan. 30, 1974, 74.03099

Int. Cl.² B60S *1/04*

U.S. Cl. 15—250.42 **4 Claims**

1. In a windshield wiper blade assembly having a primary bridge member, a secondary bridge member pivotally mounted on each end of said primary bridge member and a flexible wiper member engaging each of said secondary bridge members at a plurality of spaced zones, the improvement comprising:

said primary bridge member being substantially rigid;

each of said secondary bridge members being of a unitary single structure and being resiliently bendable in a plane containing all said bridge members;

means fixed on said secondary bridge members defining at least three of said pressure zones longitudinally spaced along each of said secondary bridge members; and

said pressure zones of each of said secondary bridge members, when said bridge members are unstressed and at rest, being relatively arranged to each other to cause said wiper member to define a curve concave on the side thereof facing away from said bridge member.

3,969,785

RESIDUAL TONER REMOVING APPARATUS

Masaya Ogawa, Sakai, and Tetsuhisa Furukawa, Toyokawa, both of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Apr. 22, 1974, Ser. No. 463,177

Claims priority, application Japan, May 8, 1973, 48-53769[U]

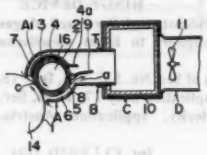
Int. Cl.² A47L *5/38*; G03G *21/00*

U.S. Cl. 15—301 **9 Claims**

1. In a residual toner removing apparatus for use in cleaning a photoreceptor surface of an electrostatic copying machine, said apparatus being of the type including a cleaner section including a housing and a cleaner brush rotatably provided within said housing, said housing having an opening, said cleaner brush extending through said opening so that it is engageable with a photoreceptor surface to be cleaned, and said cleaner section further having a first semi-circular concave casing partially enclosing said cleaner brush, said first casing extending away from said opening into said housing, and a duct section extending from said cleaner section housing, a filter section housing having a filtering member therein and coupled to said duct section and a suction section coupled to said filter section;

the improvement including means for removing toner particles from a photoreceptor surface and said cleaner brush and comprising:

a semi-circular concave second casing forming a portion of said cleaner section housing opening and leading to said duct section and partially enclosing said cleaner brush, said first casing contacting at an inner face thereof bristles of said cleaner brush, an air passage formed between



said cleaner section housing and said first casing, a rear portion of said first casing and a rear portion of said second casing leading to said duct section and forming a duct opening;

a flicker member positioned substitutially centrally of said duct opening, said flicker member being positioned to contact said bristles of such cleaner brush during rotation of said brush; and

an air flow regulating plate means, fixed to said flicker member and extending from said flicker member substantially centrally of said duct section toward said filter section housing, for preventing the formation of air vortices at the back of said flicker member, there being open communication through said duct opening between said cleaner brush and said duct section both above and below said plate means;

the toner particles removed from said cleaning brush thereby being prevented from becoming reattached to said brush.

3,969,786

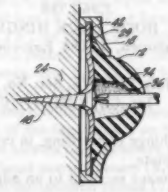
WALL BUMPER

Ben Peak, Yorba Linda, Calif., assignor to Builders Brass Works, Los Angeles, Calif.

Continuation of Ser. No. 412,657, Nov. 5, 1973, abandoned. This application Feb. 19, 1975, Ser. No. 551,068

Int. Cl.² E05D *15/58*

U.S. Cl. 16—86 A **3 Claims**



1. A wall bumper comprising a housing having a forward wall portion with an aperture therethrough and an annular

side wall portion defining an open end adapted to abut a wall, said wall portion having an annular channel therein, the forward wall of said channel defining a substantially flat support surface, a resilient bumper member having a forward contact portion extending through said aperture and an enlarged rear portion abutting the interior of said forward wall portion of said housing, a retaining plate having an aperture therethrough and being disposed within said housing rearwardly of said bumper member, the perimeter portion of said plate being disposed within said annular channel in the side wall portion of said housing and in contact with said support surface and the central portion of said plate being deformed to press said enlarged portion of said bumper member against the interior of said forward wall portion of said housing thereby securing said resilient bumper member within said housing and a threaded fastening means adapted to extend through said aperture in said retaining plate and into a wall to which said bumper is to be secured.

3,969,787

HINGE DEVICE

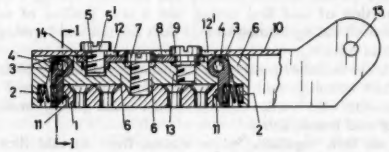
Erich Röck, Höchst, and Bernhard Mages, Dornbirn, both of Austria, assignors to Blum Gesellschaft m.b.H., Hochst, Austria

Continuation of Ser. No. 533,745, Dec. 18, 1974, abandoned. This application July 17, 1975, Ser. No. 596,809

Claims priority, application Austria, Dec. 24, 1973, 10792/73

Int. Cl.² E05D 7/04

U.S. Cl. 16—129 **9 Claims**



1. A hinge device, particularly for mounting a door to a piece of furniture, said device comprising:

a mounting plate adapted to be attached to a piece of furniture, said mounting plate having recesses therein;

an intermediate part positioned on the top of said mounting plate, said intermediate part having hook members received in said recesses, said intermediate part having clamping means extending therethrough into abutment with said mounting plate to fix said intermediate part to said mounting plate;

a hinge arm connected to said intermediate part and having a substantially U-shaped lateral cross-sectional configuration to embrace said mounting plate; and

said hinge arm having open opposite ends, the open width of which is greater than the lateral breadth of said mounting plate, the breadth of said hook members being equal to said open width of said open ends of said hinge arm.

3,969,788

DOOR LOCK HINGE

Richard C. McCullough, 11154 Eastwood Ave., Inglewood, Calif. 90304

Filed July 14, 1975, Ser. No. 595,381

Int. Cl.² E05D 11/10

U.S. Cl. 16—144 **8 Claims**

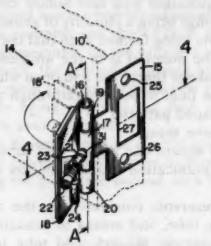
1. A door lock hinge comprising, in combination:

a. a first hinge plate;

b. hinge shaft means secured to an edge of said first hinge plate;

c. a second hinge plate having journalling means at an edge adjacent to said first mentioned edge surrounding at least a portion of said hinge shaft means to hinge said second plate to said first plate at the adjacent edges for swinging movement about the axis of said hinge shaft means; and,

d. bolt means mounted on said second plate for sliding movement in a direction normal to the axis of said hinge shaft means, said hinge shaft means including a receiving bore normal to its axis positioned to receive said bolt



means when said second plate is at a right angle to said first plate whereby said plates may be locked in a right angle position so that when one plate is secured to the inside edge of a door frame, the other plate will overlie a marginal face portion of a door when closed to thereby hold said door closed.

3,969,789

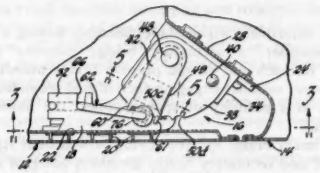
DOOR HOLD-OPEN MECHANISM

Gary A. Wize, Washington, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed May 27, 1975, Ser. No. 581,157

Int. Cl.² E05D 11/10

U.S. Cl. 16—145 **3 Claims**



1. In a door hinge mechanism mounted between an automotive door edge and a rigid body portion adjacent thereto, the improvement comprising a hinge member secured to said door edge, a bracket secured to said rigid body portion, a hinge pin mounted through portions of said hinge member and said bracket, a hinge sector secured to said hinge member, a plurality of detent slots formed along an edge of said hinge sector, a directional cam pivotally mounted adjacent said hinge sector, a cam slot formed in an edge of said directional cam, first and second shoulders forming opposite corners of said cam slot, first and second seats formed adjacent said first and second shoulders, respectively, a torque-rod secured at one end thereof to said bracket, and a roller rotatably mounted on said torque-rod adjacent the other end thereof and urged thereby into contact with one of said plurality of detent slots when the door is stopped and urged by one of said first and second shoulders onto one of said first and second seats, respectively, when the door is set in motion, overriding said detent slots until the door is once again stopped, after which any slight reverse force thereagainst causes said roller to snap back into said cam slot and the nearest of said detent slots.

3,969,790

POULTRY PROCESSING EQUIPMENT

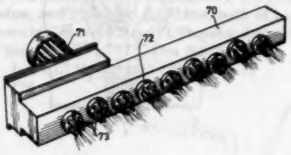
Johannes Jacobus Smorenburg, Abcoude, Netherlands, assignor to Stork Brabant, B.V., Boxmeer, Netherlands

Filed Jan. 18, 1974, Ser. No. 434,621

Claims priority, application Netherlands, Jan. 25, 1973, 7301113

Int. Cl.[2] A22C 21/00

U.S. Cl. 17—11.1 R 6 Claims



1. Apparatus for processing slaughtered poultry which is hanging from a conveyor track by its legs and moved along a path, comprising a plucking device having a plurality of rotatable discs on either side of the path of the poultry, said disks having plucking fingers directed to the path of the poultry, said plucking device having pipe means with a plurality of outflow openings therein and in the proximity of the plucking discs said openings being directed towards said path, and said pipe means being connected to one or more sources of hot water, hot air, steam or another suitable medium or a mixture thereof such that during the plucking operation performed by the plucking fingers the poultry is exposed to the effect of the medium brought thereon via the outflow openings.

3,969,791

BUTTON AND RETAINER

Alvin H. Bernstein, 221 Countryside Lane, Mount Laurel, N.J. 08054, and Domenic J. Santulli, 344 S. 18th St., Philadelphia, Pa. 19103

Filed Apr. 14, 1975, Ser. No. 568,213

Int. Cl.[2] E05F 3/04

U.S. Cl. 24—56 11 Claims

1. An article of manufacture comprising a button and a retainer associated therewith, said button having means thereon for enabling the button to be secured to a portion of a shirt collar so that the button may extend through a buttonhole in another portion of the shirt collar, said retainer having a portion angled downwardly and terminating in a free end, said retainer portion projecting forwardly from a front face of the button so that said portion may be pivoted upwardly for contact with a necktie as a result of force on the button by tightening of the necktie, and said means for enabling said button to be secured to a portion of a shirt collar being at an elevation above the elevation of the upper end of said retainer portion, said downwardly extending retainer portion being curved so as to be concave downwardly.

3,969,792

BUCKLE FOR STRAPPING PARCEL OR THE LIKE WITH TAPE

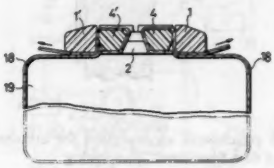
Kenji Hattori, 6,9-Banchi, Miyamae-cho, Numazu, Shizuoka, Japan

Filed Feb. 18, 1975, Ser. No. 550,342

Claims priority, application Japan, Sept. 21, 1974, 49-108322; Oct. 4, 1974, 49-119362

Int. Cl.[2] A44B 11/02, 11/06

U.S. Cl. 24—74 A 1 Claim



1. In a buckle for strapping packages having a rectangular frame portion (A) with one pair of lateral parallel sides (1, 1'), a pair of end sides (2, 2') with a rectangular aperture (3) in the center, a leg portion (B) having a pair of parallel legs (4, 4') and a connecting portion (C) having a pair of parallel connecting members (5, 5') connecting said legs (4, 4') and one of said end sides (2'), in combination: angular projections (6, 6') on said lateral sides (1, 1') inclined toward the outside of said lateral sides leaving narrow flat planes slightly higher than the surfaces of said end sides (2, 2') along those edges of said lateral sides (1, 1') facing the rectangular aperture (3), said aperture (3) being formed with inclined planes (7, 7', 8, 8') of said end sides (2, 2'), said inclined planes being inclined toward the inside of said end sides (2, 2'), the width (W, W1) of said legs (4, 4') being selected so that when said legs (4, 4') are folded at said connecting members (5, 5') toward the framed portion (A) some spaces (S, S1, S2) will be left between said legs (4, 4') and said projections (6, 6'), said legs (4, 4') being formed with inclined convex planes (9, 9', 10, 10') and also with flat planes (13, 13', 14, 14'), said inclined convex planes (7, 7', 8, 8') of said end sides (2, 2') and said flat planes (13, 13', 14, 14') being capable of connecting the surfaces of said end sides (2, 2') when said legs (4, 4') are fitted into said rectangular aperture (3), said legs moreover having groove-like recesses (17, 17') in their bottom at right angles to the directions of their parallel arrangement and a width (W3) nearly equal to the width (W2) of the rectangular aperture (3), the depth of said recesses (17, 17') nearly corresponding to the thickness of a strapping tape the top longitudinal width of said legs (4, 4') being equal to the width (2) of said aperture (3), said legs (4, 4') being formed with upwardly inclined planes (15, 15') on their confronting sides and also with upwardly inclined planes (16, 16') on their other sides leaving some flat planes, said legs (4, 4') having a space between confronting planes, the connecting members (5, 5') being relatively thin and having widths somewhat smaller than the widths (W, W1) of the legs (4, 4') so that when the legs (4, 4') are bent at the connecting members (5, 5') toward the aperture (3), the inclined convex planes (9, 9', 10, 10') come into tight contact with the inclined planes (7, 7', 8, 8') and the flat planes (13, 13', 14, 14') of said legs (4, 4') come into tight contact with the flat planes of said end sides (2, 2') and said legs (4, 4') span over the aperture (3).

3,969,793

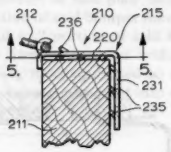
SPRING CONSTRUCTION

Lawton H. Crosby, Lake Bluff, Ill., assignor to Morley Furniture Spring Corporation, Chicago, Ill.

Continuation of Ser. No. 415,940, Nov. 15, 1973, abandoned, which is a continuation of Ser. No. 185,196, Sept. 30, 1971, Pat. No. 3,773,310. This application June 17, 1975, Ser. No. 587,717

Int. Cl.² A44B *21/00*; F16F *3/02*; A47C *23/02*

U.S. Cl. 24—84 B 9 Claims



1. A rail attachment arrangement for attaching a sinuous spring band to a frame rail, comprising:

a. an attachment clip,

b. said rail having vertical inner and outer surfaces and a horizontal top surface,

c. said attachment clip including an anchor leg seated on said outer surface and an attachment leg seated on said top surface,

d. said attachment leg having hook means formed thereon and a linear wire segment of the spring band being seated in said hook means for connecting the end of said band to said clip,

e. said hook means being positioned on said top surface so that said linear wire segment is disposed at least substantially in back of the plane of said inner surface,

f. said spring band normally being effective to draw said anchor leg against said outer rail surface and, at the same time, tending to draw it upwardly on said surface,

g. a plurality of anchor tangs formed inwardly from said anchor leg and being inclined upwardly from the horizontal whereby when forced against said outer rail surface by spring band force they bite into the wood and prevent upward movement of said clip on said rail,

h. and anti-backoff means on said attachment leg for preventing outward movement of said clip on said rail,

i. said anti-backoff means comprising foot means depending from the free end of said attachment leg and bearing against the inner surface of said rail to prevent rearward movement of said clip on said rail.

3,969,794

CONCEALED ZIPPER FASTENER

Hiroyuki Ebata, Uozu, Japan, assignor to Yoshida Kogyo Kabushiki Kaisha, Japan

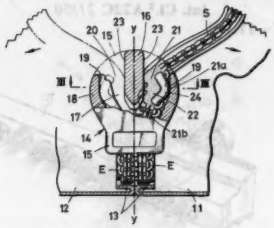
Continuation of Ser. No. 329,589, Feb. 5, 1973, abandoned. This application Sept. 16, 1974, Ser. No. 506,106

Claims priority, application Japan, Feb. 7, 1972, 47-15624

Int. Cl.² A44B *19/36*

U.S. Cl. 24—205.11 F 3 Claims

1. A zipper fastener which comprises a pair of stringer tapes each having an inside edge portion, a row of fastener elements formed from plastic filament and secured to the inside edge portion of each stringer tape, a slider movably mounted on said tapes for coupling and uncoupling said fastener elements and provided centrally with a guide post and side flanges defining therewith guide channels each for the passage of a respective row of fastener elements, said side flanges each having an inner side wall surface which lies adjacent an inlet of a corresponding guide channel and in spaced apart relation to a side wall of said guide post, and retaining means defined by at least one portion of a row of fastener elements deformed into an expanded sidewise configuration disposed for pressure engagement with a respective side wall of the guide post and a respective inner side wall of a side flange to lock the slider against retractive movement in the fully closed disposition of the fastener, said inner side wall surface being oppositely



disposed to the guide post and extending substantially parallel with the longitudinal axis of the slider whereby the retaining means is held in pressure engagement with said wall surface and the guide post against the influence of external lateral forces applied to the tapes and tending to open the fastener.

3,969,795

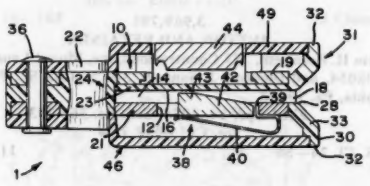
SAFETY BELT BUCKLE

Robert L. Stephenson, Sterling Heights, Mich., assignor to Allied Chemical Corporation, Morris Township, N.J.

Filed Sept. 16, 1974, Ser. No. 506,070

Int. Cl.² A44B *11/26*

U.S. Cl. 24—203 AL 13 Claims



1. A safety belt buckle comprising:

a. a housing having an opening therein and provided with a cavity extending from said opening to a wall of said housing opposite said opening;

b. inlet means communicating with said cavity for receiving a tongue of a seat belt;

c. connecting means for connecting the housing to the seat belt;

d. movable latching means for engaging the tongue of said seat belt;

e. manually operable actuation means for actuating said latching means;

f. said housing formed of at least three laminated plates in contact with one another and secured together, said laminated plates including a first plate, a second plate and a third plate, said second plate disposed between said first plate and said third plate;

g. each of said plates having a cavity in the central portion thereof, said cavities in substantial alignment with one another;

h. said cavity in at least said second plate extending from an edge of said second plate into the central opening thereof for receiving said tongue, a portion of said latching means extending in and movable within said cavity of at least said second plate and said third plate, a portion of said

actuating means extending in and movable in said cavity of at least said first plate;

i. said second plate being made of a polymeric material and further including guide means extending from the interior of said cavity to a point of termination on the exterior surface of said housing for guiding the tongue into the housing.

3,969,796

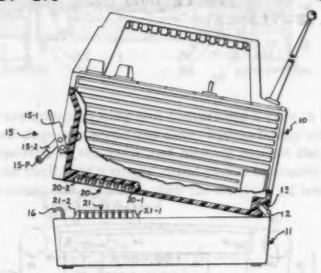
RELEASABLE FASTENING ARRANGEMENT FOR A RADIO HOUSING AND A BATTERY HOUSING

Roy F. Hodsdon, and Friedrich H. Mann, both of Lynchburg, Va., assignors to General Electric Company, Lynchburg, Va.

Filed Sept. 17, 1975, Ser. No. 614,260

Int. Cl.² H01R 13/54; H01B 1/38

U.S. Cl. 24—270 4 Claims



1. An improved arrangement for releasably fastening a radio housing or the like to a battery housing or the like comprising:

a. a retaining projection mounted on the upper surface of the battery housing near a first end thereof, said retaining projection extending at an acute angle from said upper surface toward a second end of said battery housing opposite said first end;

b. a first retaining member mounted on said battery housing near said second end thereof, said first retaining member having a retaining surface facing in a direction generally toward the bottom of said battery housing;

c. a separating projection mounted on said upper surface of said battery housing between said ends thereof, said separating projection having at least one separating surface that slopes upwardly from said upper surface in a direction from one of said ends toward the other of said ends of said battery housing;

d. a retaining recess positioned in the lower surface of the radio housing near a first end thereof, said retaining recess having a configuration which receives said retaining projection and removably holds said first end of said radio housing and said first end of said battery housing together when said retaining projection is inserted into said retaining recess;

e. a latching arm pivotally mounted on said radio housing near a second end thereof opposite said first end, said latching arm having a second retaining member that is adapted to engage said first retaining member on said battery housing and to hold said second end of said radio housing and said second end of said battery housing together;

f. a separating recess positioned in the lower surface of said radio housing between said one end and said other end thereof, said separating recess having at least one separating surface that slopes inwardly from said lower surface in a direction from one of said ends of said radio housing toward the other of said ends of said radio housing;

g. and said separating surface of said separating projection and said separating surface of said separating recess being correspondingly positioned and configured so as to be substantially in registry when said radio housing and said battery housing are positioned and held together, and so that impact to said radio housing and said battery housing when so held tends to separate said housings.

3,969,797

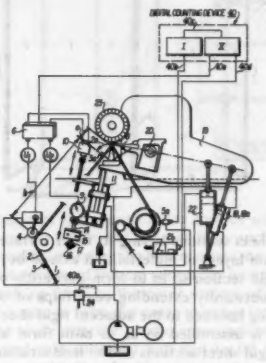
APPARATUS FOR REGULATING THE SHEARING OF PILE FABRIC

Dieter Riedel; Horst Rathert, both of Minden, and Gerhard Grannemann, Friedewalde, all of Germany, assignors to Drabert Sohne, Minden, Westphalia, Germany

Continuation-in-part of Ser. No. 120,545, March 3, 1971, abandoned. This application Apr. 4, 1973, Ser. No. 347,713

Int. Cl.² D06C 13/00, 13/02

U.S. Cl. 26—15 R 8 Claims



1. In a control arrangement incorporated in a shearing machine for shearing material having a base layer and a nap,

cutter means,

shearing bar means spaced by a gap from the cutter means and supporting the said material in nap cutting relationship with the cutter means,

means carrying the shearing bar and cutter means for adjusting the gap between the bar means and the cutter means whereby the cut effected is varied,

means for sensing continuously the thickness of the base layer and generating a signal having a value dependent upon that thickness,

a measured value recorder for measuring the actual size of the shearing gap of the machine and for generating a signal having a value dependent upon that gap,

regulating means connected to the sensing means and the measured value recorder whereby to receive both said signals and to generate a difference signal, and

a re-set device connected to receive said difference signal and to vary the shearing gap of the machine by action on said carrying means until the difference signal reaches zero magnitude.

3,969,798

BLANKS FOR COFFINS

Anders Lennart Sahlin, Vallingby, Sweden, assignor to Anders Sahlin AB, Vallingby, Sweden

Filed Jan. 23, 1974, Ser. No. 435,792

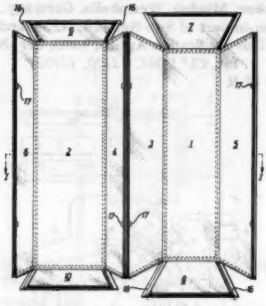
Claims priority, application Sweden, Jan. 23, 1973, 7300930

Int. Cl.³ A61G 17/00

U.S. Cl. 27—4 6 Claims

1. A blank for a coffin consisting essentially of the combination of a thin outer layer of a flexible material with high tensile strength forming the entire outer surface of the coffin, a plurality of rigid sheet sections attached to various portions of the inner side of said outer layer of flexible material, which rigid sheet sections are intended to be folded in an unobstructed edge-to-edge relationship to each other along lines parallel to

their adjacent edges and directly abut against each other to form a coffin cavity using said flexible outer layer as a combined pivot and connecting member to hold the edges of said rigid sections together under tension in direct edge-to-edge abutting relationship, said outer surface extending beyond the sections forming the sides of the coffin so as to make flaps which can be fastened to the outer sides of the coffin, each of



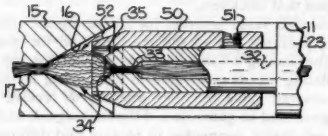
said rigid sheet sections having its inner surface covered with separate thin layers of material that extend beyond the edges of each rigid section so as to form outwardly extending edge flaps, the outwardly extending edge flaps of one rigid sheet section being fastened to the adjacent rigid sheet section when the coffin is assembled so as to both form a seal between adjacent rigid sheet sections and to lend structural stability to the coffin.

3,969,799

TURBULENCE GENERATOR FOR YARN TEXTURING AIR JET

Richard J. Polney, New Castle, Del., assignor to Enterprise Machine and Development Corporation, New Castle, Del.

Filed May 12, 1975, Ser. No. 576,296
Int. Cl.² D02G 1/16
U.S. Cl. 28—1.4 **9 Claims**



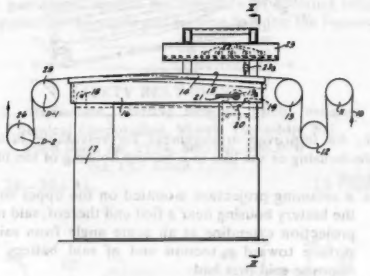
1. In a yarn texturing air jet of the type including an elongate housing having a central bore therethrough, a venturi supported in the central bore and in the exit end of said housing, an inwardly tapering conical surface on the inner end of said venturi and terminating in an exit orifice extending through the exit end of said venturi, a yarn guiding needle positioned in the central bore of said housing and having an inner end portion defining an exit end of said needle, said needle having an axial yarn guiding channel extending therethrough for directing multifilament yarn through said needle and toward said venturi, said inwardly tapering conical surface of said venturi defining the exit end of a turbulence chamber, and means for directing pressurized gas into the central bore of said housing and along said inner end portion of said needle whereby the gas passes through said turbulence chamber and outwardly through said exit orifice of said venturi to impart crimps, curls and loops to the filaments as the yarn passes through said turbulence chamber, the combination therewith of means for improving the turbulence and enhancing the crimps, curls and loops imparted to the yarn passing through said turbulence chamber, said means comprising a tubular extension projecting outwardly beyond said exit end of said needle and having an inner end portion positioned closely adjacent said inwardly tapering conical surface on the inner end of said venturi whereby the entrance end of said turbulence chamber is defined by said exit end of said needle and said tubular extension on the inner end of said needle.

3,969,800

STRETCHING DEVICE FOR FILAMENTS OR STRANDS

Giorgio Baldini, and Gianpietro Trentini, both of Turin, Italy, assignors to Beloit Corporation, Beloit, Wis.

Continuation of Ser. No. 284,210, Aug. 28, 1972, abandoned.
This application Sept. 30, 1974, Ser. No. 510,159
Int. Cl.² D02J 1/22
U.S. Cl. 28—71.3 **4 Claims**



1. A mechanism for producing plastic filaments comprising in combination:

means for supplying continuous filaments of plastic, said filaments extending from a delivery roll to a receiving roll;

a heating means having an arcuate heat transfer surface positioned to be contacted by said filaments with said filaments wrapping said arcuate surface and sliding therealong in a circumferential direction in heat transfer engagement therewith;

radiant heating means opposite said heat transfer surface for heating said heat transfer surface to a predetermined temperature for heating said filaments;

means for applying a continuous axial tension to said filaments holding them in sliding heat transfer surface engagement with said heat transfer surface;

and means for adjusting the position of said heat transfer surface toward or away from the path of travel of said filaments so as to change the length of arc on said heat transfer surface contacted by said filaments so that the time of engagement of said filaments with said heat transfer surface is changeable, said adjusting means including a pivotal support for the trailing end of said heat transfer surface adjacent said receiving roll and adjustable means for moving the leading end of said heat transfer surface adjacent said delivery roll to change said length of arc on said heat transfer surface contacted by said filaments whereby the location where said filaments first engage said heat transfer surface is variable.

3,969,801

FLEXURE COMPENSATING ROLL

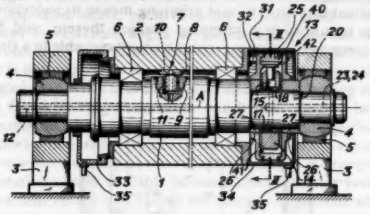
Anton Dolenc, Winterthur, Switzerland, and Anton Herter, Friedrichshafen, Germany, assignors to Escher Wyss Limited, Zurich, Switzerland

Filed May 2, 1975, Ser. No. 574,099

Claims priority, application Switzerland, May 8, 1974, 6245/74

Int. Cl.² B21B 13/02

U.S. Cl. 29—116 AD 7 Claims



1. A flexure compensating roll comprising a core, a hollow annular shell disposed about the core, hydraulically actuated pistons supported in the core and bearing against the inside surface of the shell, and a rotary radial piston hydraulic motor coupled between the core and shell for delivery of torque to the shell.

3,969,802

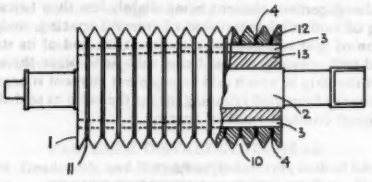
MILL ROLL

Jean Bouvet, P.O. Box 131, Ookala, Hawaii 96774

Continuation-in-part of Ser. No. 464,140, April 25, 1974. This application Feb. 3, 1975, Ser. No. 546,694

Int. Cl.² B21B 27/02

U.S. Cl. 29—121 R 5 Claims



1. A mill roll of the character described, to be used in combination with one or more rolls in a mill for grinding a material, such as sugar cane and the like, while extracting the juice therefrom, comprising a rigid body having a plurality of peripheral grooves formed circumferentially thereon, a plurality of channels within the body of the roll extending axialy of the roll throughout the roll body, a plurality of holes extending substantially radially from the bottom of said grooves and communicating with said channels, whereby, during operation, the passage of extracted juice through the holes and channels tends to increase the recovery of juices.

3,969,803

METHOD OF MANUFACTURING SPHERICAL BEARING

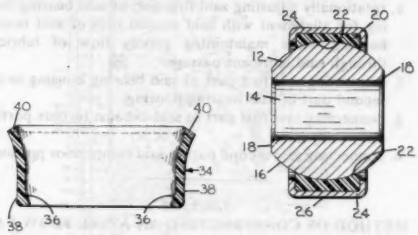
Albert R. McCloskey, Fairfield, Conn., assignor to Heim Universal Corporation, Fairfield, Conn.

Filed Oct. 25, 1974, Ser. No. 517,878

Int. Cl.² B21D 53/10

U.S. Cl. 29—149.5 C 3 Claims

1. A method of manufacturing a spherical bearing having an outer sheet metal cylindrical member, an intermediate yieldable plastic member enclosed and supported thereby, said intermediate member having a concave inner surface and a spherical ball in bearing relationship with said intermediate plastic member, said spherical ball having an outer surface complementary to said concave inner surface of said intermediate member comprising the steps of preforming the outer member into a truncated conical member having a first radially inwardly annular lip formed at one end thereof, preforming the plastic intermediate member wherein the outer surface of said intermediate member is substantially cylindrical with one end outwardly flared, the inner surface of said intermediate member being partially spherical in the region remote from said flared end of said intermediate member, inserting said ball within the inner surface of said intermediate member



such that a portion of the convex outer surface of said ball intimately engages the preformed concave inner surface of the intermediate member, inserting the intermediate member with the spherical ball contained therein within the outer member, applying a deforming force to the outer surface of the outer member by die means to form the outer member into a cylindrical shape and to deform the plastic intermediate member completely around said spherical ball and to fill the space between said spherical ball and said outer member said intermediate member providing the entire bearing surface for said spherical ball, deforming the undeformed end of said outer member around the intermediate member to form a second radially inwardly annular lip and to complete the bearing.

3,969,804

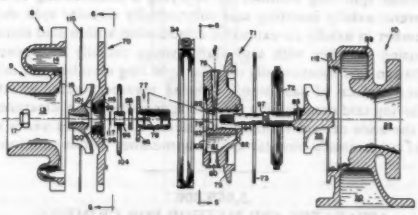
BEARING HOUSING ASSEMBLY METHOD FOR HIGH SPEED ROTATING SHAFTS

Hugh MacInnes, La Canada, and Paul M. Uitti, Huntington Beach, both of Calif., assignors to Rajay Industries, Inc., Long Beach, Calif.

Division of Ser. No. 428,832, Dec. 27, 1973, Pat. No. 3,941,437. This application Apr. 14, 1975, Ser. No. 567,857

Int. Cl.² B23P 15/00; F04B 17/00

U.S. Cl. 29—156.4 R 4 Claims



1. A method of assembling a turbocharger for use on any given design of internal combustion engine, said turbocharger having a two part bearing housing for enclosing a semi-floating axial thrust type bearing, a first part of said bearing housing having a hole for receiving said bearing and a shaft therein, said first part having passages therethrough substantially perpendicular to said hole for allowing gravity flow of lubricant to said bearing and shaft, a second part of said two part bearing housing also having a hole to receive said bearing and said shaft and having a surface for counteracting axial thrust of said bearing, said method consisting of;

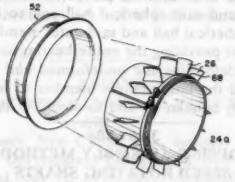
a. positioning an exhaust turbine portion of said turbocharger in proper relationship for connection to an exhaust system of said engine;
b. rotating said first part of said bearing housing in relation to said exhaust turbine portion to provide essentially vertical alignment of said lubricant passages for gravity flow of lubricant therethrough;
c. positioning a compressor portion of said turbocharger in proper relationship for connection to the fuel intake of said engine;
d. rotating said second part of said bearing housing for proper alignment with said compressor portion;
e. rotationally adjusting said first part of said bearing housing for alignment with said second part of said bearing housing while maintaining gravity flow of lubricant through said lubricant passages;
f. connecting said first part of said bearing housing to said second part of said bearing housing;
g. connecting said first part to said exhaust turbine portion; and
h. connecting said second part to said compressor portion.

3,969,805

METHOD OF CONSTRUCTING AN AXIAL FLOW FAN

Ronald J. Lievens, Onalaska, and Richard W. Kabat, Genoa, both of Wis., assignors to The Trane Company, La Crosse, Wis.

Filed Dec. 23, 1974, Ser. No. 535,431
Int. Cl.² B23P *15/04*, *11/02*
U.S. Cl. 29—156.8 R **7 Claims**



1. In the method of assembling an axial flow fan, the steps of providing an axially extending generally circular annular stator housing member having a radially inner surface; providing a substantially circular split ring member; providing a plurality of separate stator vanes; attaching said vanes to said split ring member; reducing the diameter of said substantially circular split ring member by applying a constraining force thereto; axially inserting said substantially circular split ring member in axially co-extensive relationship within said stator housing member with said stator vanes radially interposed between said substantially circular split ring member and said inner surface of said stator housing member; subsequently relieving said constraining force to reduce the radial clearance at the ends of said vanes; and welding each of said vanes to said substantially circular split ring member in this position.

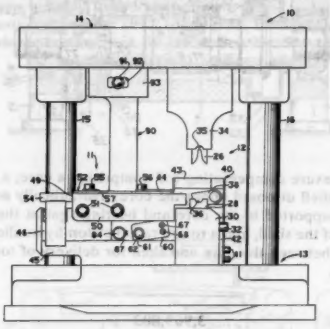
3,969,806

APPARATUS AND METHOD FOR CRIMPING TERMINALS

William S. McCaughey, Naperville, Ill., assignor to Bunker Ramo Corporation, Oak Brook, Ill.

Continuation of Ser. No. 333,630, Feb. 20, 1973, abandoned.
This application Nov. 21, 1974, Ser. No. 525,900
Int. Cl.² H01R *43/04*
U.S. Cl. 29—203 DS **8 Claims**

1. Apparatus for connecting conductors to electrical terminals supplied to such apparatus in the form of strips whereon said terminals are carried at uniformly spaced intervals along an elongated carrier having feed apertures formed therein and spaced along the length thereof at the same interval as said terminals, and wherein said terminals may be supplied as different strips having different uniformly spaced terminal intervals as aforesaid, but said different strips having a constant value of spacing between a terminal and a feed aperture therefor, said apparatus being capable of accepting, without adjustment, strips as described and having interval spacings from a minimum value to slightly less than twice that minimum value, said apparatus comprising: crimping means for crimping a terminal positioned therein to a conductor, and reciprocating feed means for feeding a terminal strip in a longitudinal direction to said crimping means to successively position terminals in a crimping position therein, said feed means comprising an engagement element movable in a stroke



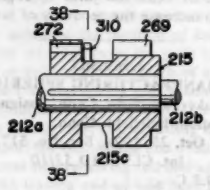
toward and away from said crimping means and arranged to engage and advance the terminal strip by entering an aperture thereof during movement of said engagement element toward said crimping means, and to release from engagement with the terminal strip during movement of said engagement element away from said crimping means, the stroke of said movement of said engagement element being slightly less than twice the length of said minimum value of interval spacing, and the position of said engagement element at the end of its stroke toward said crimping means being such as to place the aperture of the strip in which said engagement element is engaged at a distance from said crimping means the same as said aforementioned constant value of spacing.

3,969,807

CORE WIRE-CONNECTING DEVICE

Jun Takizawa, Tokyo; Kazuyuki Oshima, Kawasaki; Hikaru Yamamoto, Chiba; Kooji Kuribayashi, Ichihara, and Toshio Suzuki, Kamakura, all of Japan, assignors to Nippon Telegraph and Telephone Public Corporation; The Fujikura Cable Works, Ltd.; The Furukawa Electric Co., Ltd., all of Tokyo and Sumitomo Electric Industries, Ltd., Osaka, all of, Japan

Filed Dec. 31, 1975, Ser. No. 645,886
Int. Cl.² H01R *43/04*
U.S. Cl. 29—203 DT **36 Claims**



1. A core wire-connecting device which comprises a driving shaft and a main shaft rotatably received in a fixed housing in

parallel relationship with each other; a movable housing reciprocatively mounted on the main shaft; a rotor reciprocating therewith and capable of rotating with the main shaft; a plurality of connector receptacle means formed in the periphery of the rotor equidistantly spaced in a circumferential direction for receiving connectors, each formed of a sleeve and a conical wedge received therein; intermittent rotation means provided between said main shaft and driving shaft for intermittently rotating the main shaft, together with the rotor through an angle defined by the respective adjacent receptacle means with the main shaft, each time the driving shaft is rotated through a prescribed angle; reciprocating means for moving the rotor back and forth along the main shaft when the main shaft is not rotated by the intermittent rotation means and for bringing core wires into the sleeve; connector-feeding mechanism for delivering connectors one by one from a belt-like magazine on which the connectors are arranged equidistantly lengthwise in parallel with each other to any of the receptacle means when said any of the receptacle means is brought to a first station of said movable housing; conical wedge-removing means disposed at one end of the rotor in alignment with the receptacle means at said first station for pushing the conical wedge out of the sleeve of the connector received in said receptacle means to the other end of the rotor; a core cutting-off mechanism mounted on the movable housing in alignment with the receptacle means disposed near said one end of the rotor at a second station of said movable housing which is circumferentially separated from said first station through an angle corresponding to an angle defined by the adjacent front receptacles with the axis of said rotor for cutting off the unnecessary parts of the joinable end portions of the core wires, thereby allowing the tips of the cut-off ends of the core wires to be brought into alignment; conical wedge-inserting means provided at the other end of the rotor in alignment with the receptacle means at said second station for inserting the conical wedge into the sleeve; driving means for carrying the conical wedge-inserting means toward said one end of the rotor to an extent corresponding to the distance through which the conical wedge-inserting means pushes the conical wedge now released from the sleeve received in the receptacle means at said second station; and core-holding means for immovably supporting the core wires lengthwise of the main shaft.

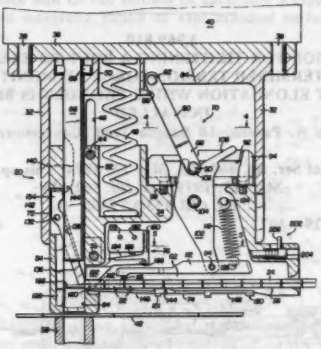
3,969,808

FASTENER INSTALLATION HEAD

Dale H. Goodsmith, and Harold A. Ladouceur, both of Livonia, Mich., assignors to Multifastener Corporation, Detroit, Mich.

Filed May 5, 1975, Ser. No. 574,776
Int. Cl.² B23P *19/04*
U.S. Cl. 29—208 D **15 Claims**

11. In a fastener installation head having two housing components, the first housing component having a plunger and a second housing component having a first passageway generally transverse to the plunger axis for receiving fasteners and a second passageway receiving said plunger and communicating with said first passageway, extension means normally extending said housing components with the plunger spaced above the intersection of said passageways, and a fastener feed means adapted to feed individual fasteners from said first passageway into said second passageway, beneath said plunger, for installation by said plunger through said second passageway, the improvement comprising: said feed means including a first lever pivotally connected to said first housing component having a free end and a second lever pivotally connected between its ends to said second housing component, said second lever pivotally connected adjacent one end to a pawl means adapted to feed fasteners into said second passageway upon rotation movement of said second lever, the opposed end of said second lever having a configured drive control face receiving said first lever free end, said control face including a slot opening toward and receiving said first lever free end when said housing components are in said extended position and a dwell face, said slot having a drive face defining one side of said slot and said dwell face extending and a linear guide means in said second housing component translating the arcuate motion of said first lever free end into linear motion relative to said second housing component, transversely from said drive face, whereby relatively closing



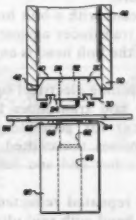
said housing components biases said first lever free end against said second lever drive face, pivotally rotating said levers in opposite directions about their respective axes until said first lever free end engages said dwell face, thereby feeding a fastener beneath said plunger, continued closing of said housing components causing said plunger to engage and install the fastener.

3,969,809

SELF-FASTENING NUT, PANEL ASSEMBLY AND APPARATUS

Thomas M. Pouch, Farmington, and Harold A. Ladouceur, Livonia, both of Mich., assignors to Multifastener Corporation, Detroit, Mich.

Division of Ser. No. 454,656, March 25, 1974, Pat. No. 3,926,236, which is a division of Ser. No. 302,312, Oct. 30, 1972, Pat. No. 3,829,957. This application Apr. 14, 1975, Ser. No. 567,785
Int. Cl.² B23P *11/00*
U.S. Cl. 29—243.5 **2 Claims**



1. An apparatus adapted to secure a nut to a panel, said nut having a planar end face, a central bore and a pair of grooves in said end face on either side of said bore, comprising: a punch member having a cylindrical punch portion and a nut retainer means surrounding said punch portion adapted to releasably retain a nut telescopically assembled on said punch portion having an external diameter substantially equal to the internal diameter of said nut bore and having an axial extent greater than the axial extent of said nut bore to extend beyond said planar end face of the nut with the nut assembled on said punch portion, and a die member having a generally planar end face, said die end face having an opening in registry with

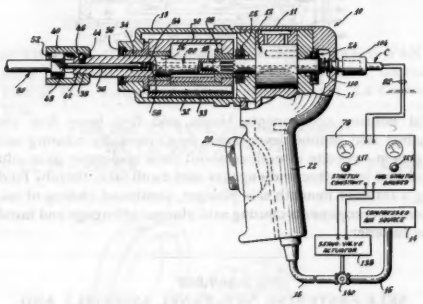
said punch portion to receive the punch portion and a pair of upstanding lips, on either side of said opening in registry with said nut grooves, whereby a panel, interposed between said nut and said die will, upon relative movement of said punch and die members, be sequentially punched to form a hole in registry with said nut bore and deformed into said nut grooves by said upstanding lips, in one continuous movement.

3,969,810

METHOD FOR TIGHTENING A BOLT TO EXERT A PREDETERMINED TENSION FORCE BY MONITORING BOLT ELONGATION WHILE THE BOLT IS BEING INSTALLED

Dominick A. Pagano, 10 Sasqua Trail, Georgetown, Conn. 06829

Division of Ser. No. 469,298, May 13, 1974. This application Mar. 27, 1975, Ser. No. 562,446
Int. Cl.² B23Q 17/00
U.S. Cl. 29—407 4 Claims



1. The method of tightening a bolt to exert a predetermined tension force by monitoring bolt elongation while the bolt is being installed comprising the steps of:

engaging the head of the bolt with drive means rotatable about an axis for tightening the bolt,

providing a bore extending through said drive means along the axis of rotation thereof,

positioning an ultrasonic transducer capable of generating and receiving ultrasonic energy in said drive means aligned with said bore,

engaging the drive means with a bolt head,

urging the ultrasonic transducer against the top surface of the bolt head while the bolt head is engaged by said drive means,

regularly repeatedly feeding electrical signal pulses through said axial bore to said transducer for energizing said ultrasonic trandsucer for generating regular repeated ultrasonic energy pulses transmitted through the bolt's head to the bolt's other end and reflected back to the bolt's head,

receiving the regular repeated reflected ultrasonic energy pulses at the bolt's head with said ultrasonic transducer,

rotating said drive means for turning the bolt for tightening the bolt,

allowing said transducer to turn with the turning movement of the bolt's head,

measuring the length of time required by each regular, repeated ultrasonic energy pulse to be transmitted through said bolt to bolt's end and reflected back to said bolt's head to measure bolt elongation, and

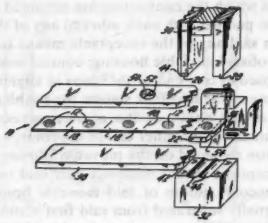
continuing rotating said drive means and thus rotating and tightening the bolt while continuing the step of urging the transducer against the bolt's head, the step of feeding electrical signal pulses for energizing the ultrasonic transducer as it turns with the bolt's head, the step of receiving and the step of measuring until the predetermined bolt elongation and hence tension force exerted by the bolt is achieved.

3,969,811

METHOD FOR APPLYING DESIGNS TO PIERCEABLE MATERIALS

Irwin Zahn, New York, N.Y., assignor to General Staple Company, Inc., New York, N.Y.

Division of Ser. No. 396,462, Sept. 12, 1973, Pat. No. 3,902,866. This application June 23, 1975, Ser. No. 589,032
Int. Cl.² B23P 17/00
U.S. Cl. 29—417 4 Claims



1. A method for applying designs to pierceable materials from a supply strip containing intermittent design portions equally spaced along the length of said supply strip, which method comprises,

a. determining a proper starting point for said supply strip by employing a locating device on said supply strip;

b. severing the end of said supply strip at a position determined by said starting point, to form a first crimping portion;

c. thereafter intermittently feeding said supply strip to a severing, bending, driving and crimping station;

d. severing a blank from the end of said supply strip to form a second crimping portion with a design portion disposed intermediate said first and second crimping portions;

e. bending said first and second crimping portions in an approximate U-shape by draping said blank over an anvil;

f. positioning a material to be decorated over the face of a clinching die; and

g. attaching said approximately U-shaped blank to said material by projecting said crimping portions through said material and into said clinching die.

3,969,812

METHOD OF MANUFACTURING AN OVERWRAPPED PRESSURE VESSEL

Emory J. Beck, Golden, Colo., assignor to Martin Marietta Corporation, New York, N.Y.

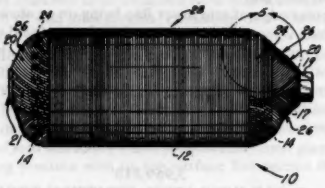
Filed Apr. 19, 1974, Ser. No. 462,356
Int. Cl.² B23P 17/00
U.S. Cl. 29—421 R 14 Claims

1. A method of manufacturing a pressure vessel including the steps of forming a liner in the shape of a cylindrical portion and a dome portion at each end thereof, overwrapping the liner by winding filament material thereabout in the following sequence:

a. wrapping filament material about the liner in the polar direction to form a first polar overwrap,

b. wrapping filament material over the first polar overwrap in a cylindrically oriented direction and of sufficient extent to cover the junctions of the cylindrical portion with the dome portions to form a first cylindrical overwrap, and

c. wrapping filament material over the first cylindrical overwrap in the polar direction to form a second polar overwrap which holds the cylindrical overwrap against movement relative to the liner.

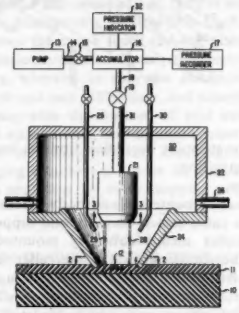


3,969,813

METHOD AND APPARATUS FOR REMOVAL OF SEMICONDUCTOR CHIPS FROM HYBRID CIRCUITS

Richard Henry Minetti, Allentown, Pa., and Robert Walter Strickland, Clarendon Hills, Ill., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J. and Western Electric Company, New York, N.Y.

Filed Aug. 15, 1975, Ser. No. 605,072
Int. Cl.² B32B *35/00*
U.S. Cl. 29—575 **20 Claims**



1. In the fabrication of circuits on a substrate, a method for removal of elements having top and bottom surfaces from said substrate comprising the steps of:

forming a sealed region around the area adjacent to the element to be removed; and

simultaneously directing a plurality of jet streams comprising a liquid medium at the area adjacent to the element and within said sealed region of sufficient force such that a portion of the jet streams is deflected by the substrate to a portion of the bottom surface of said element and lifts said element off the substrate.

3,969,814

METHOD OF FABRICATING WAVEGUIDE STRUCTURES

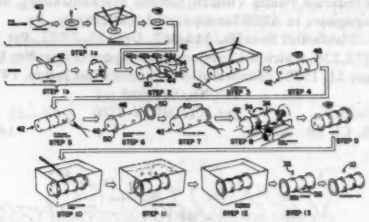
Albert Toy, Gardena; Paul T. Nelson, Rolling Hills Estates, and Clarence E. Schafer, Costa Mesa, all of Calif., assignors to TRW Inc., Redondo Beach, Calif.

Filed Jan. 15, 1975, Ser. No. 541,169
Int. Cl.² H01P *11/00*
U.S. Cl. 29—600 **14 Claims**

1. The method of fabricating a waveguide structure comprising the steps of:

selecting a mandrel having a transverse cross-section conforming to the desired internal cross-section of said structure, a relatively smooth circumferential surface and at least one threaded stud projecting radially beyond said mandrel surface;

plating said mandrel, including each stud, with a metal of relatively high electrical conductivity to form on said mandrel surface a relatively thin and uniform layer of said metal having an inner surface conforming to said mandrel surface and on the threads of each stud a layer of said metal integrally joined to said mandrel surface metal layer;



plasma spray coating the plated mandrel, including each plated stud, with a selected material to form a relatively thick layer of said material over and bonded to said metal layers; and

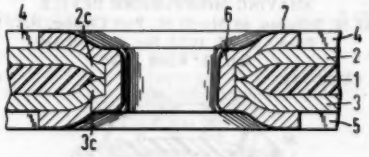
removing said mandrel, including each stud, to form a microwave structure wherein said material layer forms the body of the structure, said mandrel surface metal layer forms a high conductivity liner within said body, and said body contains a threaded radial hole corresponding to each stud and having an internal metal layer integrally joined to said mandrel surface layer for receiving a tuning screw.

3,969,815

PROCESS FOR FORMING A THROUGH CONNECTION BETWEEN A PAIR OF CIRCUIT PATTERNS DISPOSED ON OPPOSITE SURFACES OF A SUBSTRATE

Hans-Jürgen Hacke, Munich, and Robert Graf, Starnberg, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Aug. 19, 1974, Ser. No. 498,606
Claims priority, application Germany, Sept. 19, 1973, 2347217
Int. Cl.² B41M *3/08*
U.S. Cl. 29—625 **10 Claims**



1. In a process for making a circuit board having a substrate with metal circuit patterns on each side with at least one connection extending through the substrate to electrically interconnect portions of the circuit patterns on opposite sides of the substrate by providing a substrate with metal conducting layers on opposite surfaces, removing portions of the metal layers to form the metal circuit patterns on opposite sides of the substrate, and forming at least one through connection to electrically connect portions of the metal circuit patterns on opposite sides of the substrate, the improvement comprising the steps of forming the through connection comprising forming an aperture having a diameter through the substrate and the metal layers on opposite sides of the substrate, increasing

the diameter of the aperture in the substrate to produce an enlarged aperture with the overlying portions of the metal layers providing unsupported annular portions, deforming the unsupported annular portions of the layers towards each other into the enlarged aperture, and subsequently forming an electrical connection between the deformed annular portions.

3,969,816

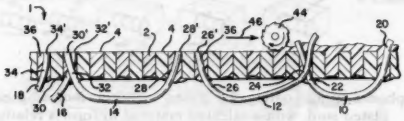
BONDED WIRE INTERCONNECTION SYSTEM

Robert Charles Swengel, Sr., York; Timothy Allen Lemke, and Frederick Phillip Villiard, both of Mechanicsburg, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Division of Ser. No. 314,062, Dec. 11, 1972, Pat. No. 3,872,236, which is a continuation-in-part of Ser. No. 152,140, June 11, 1971, abandoned. This application Jan. 6, 1975, Ser. No. 538,663

Int. Cl.² H05K *3/20*

U.S. Cl. 29—625 **14 Claims**



1. A method for fabricating an interconnection system of insulation covered wire anchored to a substrate, comprising the steps of:

bridging loops of insulation covered wire across a first surface of a substrate,

inserting portions of each of said loops into corresponding openings through said substrate,

projecting said loop portions in said openings at a second surface of said substrate,

sealing and electrically isolating said first and second surfaces of said substrate one from the other by placing solidifiable material within said openings,

bonding solidifiable material in each of said openings in encirclement around the insulation of said loop portions,

bonding solidifiable material to said substrate and to the insulation covering said loop portions, thereby anchoring said loop portions to said substrate,

trimming said loop portions adjacent said second surface to provide exposed wire ends encircled by said insulation and said solidifiable material, whereby said wire ends provide energizable signal energy surfaces.

3,969,817

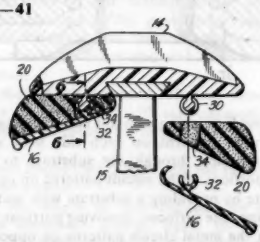
SHAVING MOISTURIZER DEVICE

Frank M. DiBuono, 68 Merrit St., Port Chester, N.Y. 10573

Filed Apr. 15, 1975, Ser. No. 568,210

Int. Cl.² B26B *21/40*

U.S. Cl. 30—41 **3 Claims**



1. A shaving moisturizer device comprising

a razor head adapted to be mounted on a stem;

a blade mounted in said head;

said head comprising a main part or body and a lower flap, said lower flap being formed integrally or unitarily with the main part or body of the razor head, said lower flap having hinge means mounting it to said main part or body and defining with said part or body a slot;

a moisture applicator disposed along and within the aforesaid slot; and

the outer edge of said lower flap being on or ahead of a line which is tangent to the edge of the body of said razor head and passes through the cutting edge, the lower flap contacts the user's face ahead of contact by the moisture applicator and is operable to produce pressure on the moisture applicator so as to express moisture onto the user's face.

3,969,818

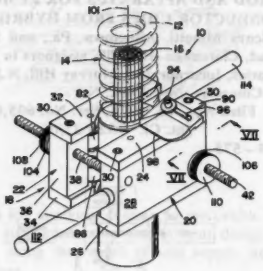
CABLE INSULATION STRIPPING TOOL

Walter J. Maytham, Los Altos, Calif., assignor to Speed Systems, Inc., Los Altos, Calif.

Filed Oct. 8, 1975, Ser. No. 620,632

Int. Cl.² H02G *1/12*

U.S. Cl. 30—90.1 **9 Claims**



1. A tool for stripping insulation from an insulated conductor cable, comprising:

body means;

support means mounted to said body means to contact and support a cable seated thereon, said support means comprising roller means rotatably mounted to the body means, the rotational axis of the roller means being angled relative to the longitudinal axis of a cable seated on said support means to provide that, upon relative turning of the body means and cable supported by the support means about the longitudinal axis of the supported cable, the supported cable and body means relatively move generally along the longitudinal axis of the supported cable for each turn of the body means and cable relatively; and

blade means mounted to said body means and having a cutting edge, the blade means being positioned so that upon relative turning of the body means and cable supported by the support means, about the longitudinal axis of the supported cable, the cutting edge cuts the insulation thereof.

3,969,819

HAIR TRIMMER ATTACHMENT

Frank R. Pepera, 4211 Milford Ave., Parma, Ohio 44134

Filed Oct. 1, 1973, Ser. No. 402,405

Int. Cl.² B26B *19/38*

U.S. Cl. 30—200 **2 Claims**

1. In a hair trimmer comprising a housing and a flat stationary shear plate of predetermined width fixed at one end of said housing and a flat oscillatable shear plate of less than said predetermined width engaging an upper side of said stationary plate and operatively connected with means in said housing for oscillating said oscillatable shear plate relative to said stationary shear plate, said plates having mutually engaging generally parallel cutting teeth extending on one side thereof

and adapted to cut hair between them upon said oscillation of said oscillatable shear plate, the combination therewith of a plurality of comb plate attachments which may be interchangeably attached to or detached from said stationary shear plate, each of said attachments, consisting of a thin flat main plate slightly wider than said predetermined width and having substantially parallel top and bottom surfaces and a series of parallel comb teeth of approximately the thickness of said thin flat plate forming a flat portion extending from the front end thereof, and clip means at opposite sides of said comb plate and rigid therewith and positioned to slidably embrace opposite ends of said stationary shear plate as said comb plate is slid into cutting position with its top surface flat against the bot-

tom of said stationary shear plate backward from said cutting teeth to a position where said comb teeth will guide hairs on a user's head into said cutting teeth, in such cutting position said comb teeth and said cutting teeth lying in separate planes, said comb plate attachments varying from each other only in the angle between the comb teeth and the plane of the main plate of the attachments so as to vary the angle between said separate planes, whereby to vary the distance between the attachment teeth and said shear plate, and whereby a user may use said trimmer with the bottom of said comb teeth flat portion of said attachment plate always against his head and whereby a user may smoothly vary the length of cut of his hairs by changing attachment plates to a shorter cut as he approaches his neck line, or other stopping point.

3,969,820

COMPOSITE DOWEL PIN FOR DENTAL MODELS

Frank M. Kulig, Bloomfield; Robert A. Semrow, Southington, and Harry P. Yorgensen, Jr., Manchester, all of Conn., assignors to The J. M. Ney Company, Bloomfield, Conn.

Filed Feb. 21, 1975, Ser. No. 551,628

Int. Cl.² A61C *13/00*

U.S. Cl. 32—11 **9 Claims**

1. A composite dowel pin for dental models comprising a metal pin and an elongated body member of synthetic resin molded about said metal pin and having a bore extending longitudinally therethrough, said metal pin extending longitudinally through the length of said bore of said body member and projecting beyond at least one end thereof, said metal pin having an external configuration providing interlocking engagement with the wall of said body member defining said bore to prevent relative movement therebetween, said body member tapering longitudinally from said one end to a reduced dimension at the other end thereof, the portion of said metal pin projecting beyond said one end of said body member providing a head with at least a portion of non-circular cross section upon which may be cast a tooth form, and said body member having a non-circular cross sectional configuration to index said dowel pin upon insertion into a model base and thereafter prevent rotation within the model base.

3,969,821

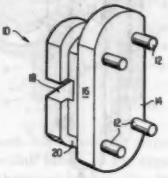
ORTHODONTIC BRACKET

Henry L. Lee, Jr., and Jan A. Orlowski, both of P.O. Box 3836, South El Monte, Calif. 91733

Filed Jan. 22, 1975, Ser. No. 543,159

Int. Cl.² A61C *7/00*

U.S. Cl. 32—14 A **8 Claims**



1. In an orthodontic bracket having a base which is adapted to be directly bonded to the front surface of a tooth by glueing and a body joined to said base, an improved orthodontic bracket comprising:

a. a posterior surface formed on said base; and

b. means attached to said posterior surface for producing a predetermined glue-line thickness measured between a tooth and said posterior surface when said posterior surface is directly bonded to said front surface of said tooth by glueing with a dental cement.

3,969,822

POROUS, STATIC PRESSURE AIR BEARING DEVICE IN A DENTIST'S HANDPIECE

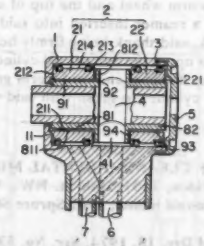
Hiromasa Fukuyama, Fujisawa, Japan, assignor to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 1, 1974, Ser. No. 447,208

Claims priority, application Japan, Mar. 6, 1973, 48-27291[U]

Int. Cl.² A61C *1/10*

U.S. Cl. 32—27 **7 Claims**



1. A porous, static pressure air bearing device in a dentist's handpiece, said device comprising a rotatable shaft for mounting thereon a cutting tool, a bearing case, an air bearing portion provided in said bearing case for supporting said rotatable shaft, a turbine blade on said rotatable shaft, said air bearing portion being formed of a hard porous material, and radial and thrust clearances between said air bearing portion and said

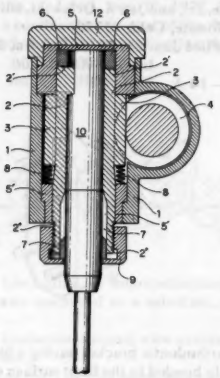
shaft whereby pressurized air passing through said bearing portion to said clearances provide radial and thrust bearings.

3,969,823

DENTAL HANDPIECE FOR A MOTOR DRIVEN REAMER

Toshimasa Nakanishi, Kanuma, Japan, assignor to Nakanishi Dental Manufacturing Co., Ltd., Kanuma, Japan

Filed Jan. 27, 1975, Ser. No. 544,331
Claims priority, application Japan, Jan. 28, 1974, 49-12074
Int. Cl.² A61C 1/10
U.S. Cl. 32—27 2 Claims



1. A dental handpiece for a motor driven reamer comprising a cylindrical member having a cup bearing coupled to its upper end and an annular bearing disposed in an opening in its lower end, wherein an annular space is formed in said cylindrical member between said cup bearing and said annular bearing, a portion of the side wall of said cylindrical member partially projecting into said annular space to form a lateral cylinder for receiving a worm gear, an annular member secured to said cup bearing, said annular member having a bottom face inclined with respect to the axis thereof, a bushing having a worm wheel around the central portion thereof, said bushing being rotatably inserted into said cylindrical member, the top face of said bushing being inclined with respect to the axis thereof thereby forming a cam mechanism with the bottom face of the annular member, said bushing having an annularly widened opening therein adjacent its lower end to receive a collet chuck, a plurality of springs inserted at intervals in an annular space formed between the bottom of said worm wheel and the top of said annular bearing, a shank of a reamer inserted into said bushing through said collet chuck, said shank being firmly held therein, a head cap engaging the upper portion of said cylindrical member for covering said cup bearing, and said worm gear being inserted into said lateral cylinder to mesh with said worm wheel.

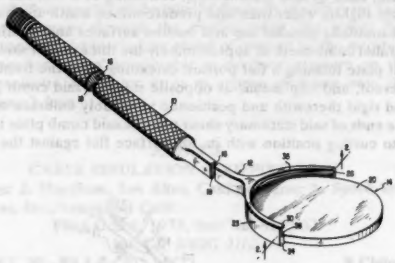
3,969,824

SELF CLEANING DENTAL MIRROR

Randy Miles Widen, 1601 18th St. NW., Washington, D.C. 20009, and Donald Simon, 1762 Spruce St., Berkeley, Calif. 94709

Filed Dec. 18, 1974, Ser. No. 534,136
Int. Cl.² A61C 3/00
U.S. Cl. 32—69 16 Claims

1. In a dental mirror having a disk-like mirror, an elongated handle, and means at one end of said handle for supporting said mirror, the improvement comprising: a liquid conduit and a gas conduit extending through said handle; a first nozzle means disposed in said support means and extending along the periphery of said mirror, said first nozzle means being associated with said liquid conduit for dispensing a thin layer of a liquid onto the surface of said mirror, and a second nozzle means, disposed in said support means above said first nozzle means and associated with said gas conduit, for dispensing a



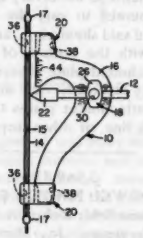
thin layer of gas across and parallel to said surface of said mirror in a laminar flow above said layer of liquid to draw said layer of liquid across said surface of said mirror in a laminar flow.

3,969,825

ARCHER'S BOW SQUARE FOR LOCATING ARROW NOCKING POINT POSITION

Larry W. Mathes, Rte. 5, Corydon, Ind. 47112

Filed Apr. 28, 1975, Ser. No. 571,981
Int. Cl.² G01B 3/30
U.S. Cl. 33—180 R 9 Claims



1. An archer's bow square comprising

confining means confining and for guiding a pointed end of a bow supported arrow when the latter is moved toward and against a string bow string so that a pointed end of an arrow will indicate a position on a strung bow string for a nocking point, said confining means being spaced from a strung bow string, and

means for detachably and slidably attaching said confining means to a strung bow string, so that a pointed end of a bow supported arrow may be adjusted to a position approximately perpendicular to a strung bow string for locating a nocking point.

3,969,826

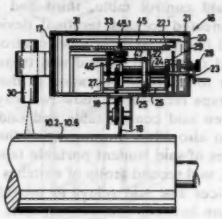
APPARATUS FOR PRE-ADJUSTING THE PLATE CYLINDERS OF PRINTING PRESSES

Ludger Ottenhues, Riesenbeck, and Willi Meyer, Ibbenburen, both of Germany, assignors to Windmoller & Holscher, Lengerich, Westphalia, Germany

Filed Aug. 29, 1974, Ser. No. 501,611
Claims priority, application Germany, Aug. 30, 1973, 2343855
Int. Cl.² B41B 1/00
U.S. Cl. 33—184.5 6 Claims

1. A gauge for pre-adjustment of a plurality of printing cylinders in a multi-color rotary printing press having a plural-

ity of printing stations, each including one of the printing cylinders for a web advancing in a path comprising, in combination, a housing, a contact roller rotatably mounted on said housing for rolling engagement with the periphery of a printing cylinder to be pre-adjusted, a dial on said housing, a drive transmission for drivably connecting said contact roller to said dial for indicating on said dial the angular displacement of a printing cylinder in peripheral contact with said roller, means for adjusting the transmission ratio of said drive transmission, indicia means on said housing including a plurality of printing



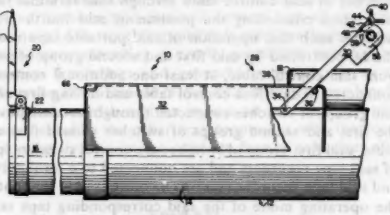
cylinder diameters and a plurality of angular adjustment values for each of the printing cylinders with respect to each of the cylinder diameters of the indicia means and means for operatively connecting said indicia means to said transmission ratio adjustment means whereby the transmission ratio is adjusted by said adjusting means in relation to a selected cylinder diameter of said indicia means for angular adjustment of all of said plurality of printing cylinders with said gauge in accordance with the adjustment values corresponding to said selected cylinder diameter.

3,969,827

FOLDING WEAPON SIGHT

Paul H. Ellis, Bel Air, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed July 11, 1975, Ser. No. 595,191
Int. Cl.² F41G *1/16, 1/04*
U.S. Cl. 33—255 **9 Claims**



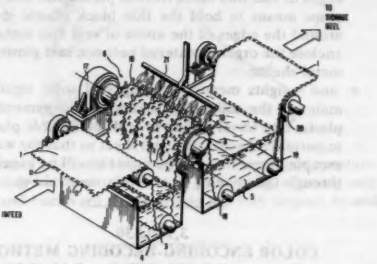
1. A sighting device for a weapon comprising:
a housing to be mounted to said weapon;
an arm rotatably mounted at one end to said housing for movement between a stored position and an operative position;
first sighting means mounted on the other end of said arm, the sighting member thereof being adjustable with respect to said arm for setting said sighting member for various ranges; and
means on said sighting means for automatically adjusting said sighting means to a predetermined range setting when said arm is pivoted into said stored position.

3,969,828

MEANS TO VIBRATE CHAIN LINK FABRIC

Keith E. Roberts, P.O. Box 485, Huntsville, Ala. 35804

Division of Ser. No. 330,118, Feb. 6, 1973, Pat. No. 3,845,741.
This application Aug. 23, 1974, Ser. No. 499,930
Int. Cl.² F26B *13/12*
U.S. Cl. 34—14 **18 Claims**



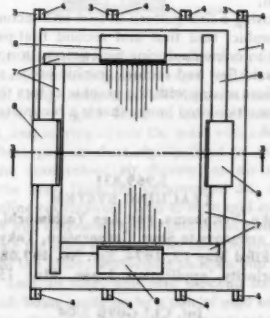
1. An arrangement for removing excess molten coating material from chain link fabric of the type having a plurality of openings formed between intersecting fabric members; said arrangement comprising:
at least one sprocket member having a plurality of outwardly projecting sprocket teeth,
and means for movably guiding chain length fabric over a predetermined portion of the circumference of said at least one sprocket member such that portions of said teeth extend through respective openings in said fabric during movement of said fabric over said at least one sprocket member,
wherein said teeth includes vibration inducing means configured and positioned with respect to said openings such that said teeth cause vibration of said fabric when said fabric is moved from a position with said portions of said teeth extending through said openings to a position with said portions of said teeth removed from said openings.

3,969,829

DEHYDRATION

William C. Urban, 2765 Glen Mawr Road, Jacksonville, Fla. 32207

Filed July 23, 1974, Ser. No. 490,971
Int. Cl.² F26B *19/00*
U.S. Cl. 34—93 **6 Claims**



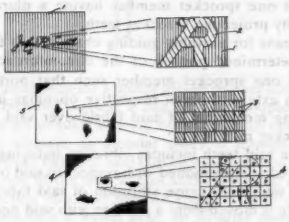
1. A solar dehydration device for solid organic material consisting of

a. a thin metal sheet having a plurality of small openings therein, upon which organic material adapted to be placed;
b. prop means formed of a material having a low thermal conductivity for supporting said thin metal sheet in spaced relation from the ground;
c. a sheet of thin black flexible plastic adapted to be placed over the organic material;
d. solid rigid strips means engaging the entire peripheral edges of said thin black flexible plastic and said solid rigid strips means to hold the thin black plastic sheet down around the edges of the arena of said thin metal sheet to enclose the organic material between said plastic and said metal sheets;
e. and weights means engaging said solid rigid strips to maintain the solid strip means in engagement with the plastic and metal sheets to seal the flexible plastic sheet to peripheral edges of metal sheet so that the water vapor escaping from the organic material will be expelled solely through the opening in said thin metal sheet.

3,969,830
COLOR ENCODING-DECODING METHOD

James A. Grasham, P.O. Box 518, Kentfield, Calif. 94904

Continuation of Ser. No. 311,229, Dec. 1, 1972, abandoned.
This application Sept. 15, 1975, Ser. No. 613,315
Int. Cl.² G09C *1/00*
U.S. Cl. 35—2 **22 Claims**



1. A method of encoding and decoding graphic material having first and second colors, said method comprising the steps:

forming a graphic having first and second colors, said first and second graphic colors being located in first areas of said graphic to correspond to, respectively, said first and second material colors, said first and second graphic colors being located in second areas of said graphic to correspond to, respectively, said second and first material colors, said graphic constituting an encoded form of said material;

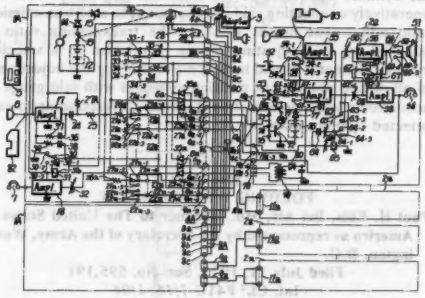
superimposing a first pattern of first and second colors and said graphic, said first and second first-pattern colors located to coincide during superimposition with, respectively, said first and second graphic areas, said first-pattern colors mixing with the graphic colors they overlie to form a multicolored image that is a reconstruction of said material.

3,969,831
TEACHING SYSTEM

Akio Hanaoka, Yokohama, and Ken Yoshimochi, Tokyo, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed May 13, 1974, Ser. No. 469,081
Claims priority, application Japan, May 15, 1973, 48-57045[U]
Int. Cl.² G09B *5/04*
U.S. Cl. 35—8 A **4 Claims**

1. A teaching system comprising at least one control table having a power supply and first and second groups of switches, said first control table also including audio input and output means, student portable tape recorders which are capable of operation independently of said control table with internal power supplies as well as connected to said control table under control of said control table, said portable tape recorders including audio input and output and including transistors, a record motor in each portable tape recorder controllable by one of said transistors, a relay in each of said portable tape recorders, a plurality of electrical terminal devices at said control table with a terminal device for each of said portable tape recorders, each portable tape recorder having a terminal device which is connectible to one of said plurality of terminal devices at said control table, third and fourth groups of switches connected to said terminal devices in each tape recorder, said first group of switches controllable at said control table and connected to said one transistor to stop said record motor to interrupt operation of the tape recorder in said student tape recorder to allow two way audio communication between said control table and said student tape recorder and to also allow monitoring of the audio input and output devices of said student portable tape recorder at said control table, said second group of switches connected to said terminal devices and said relays to provide one way audio communication between said control table and said portable student tape recorder as well as independent record mode operation of said student tape recorder, said relay in each of



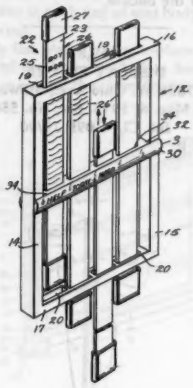
said student tape recorders connected to said second group of switches in said control table through said terminal devices, said relays controlling the position of said fourth group of switches such that operation of said portable tape recorders can be controlled by said first and second group of switches from said control table, at least one additional control table connected to said first control table and having first and second groups of switches connected through terminal devices to the first and second groups of switches of said first control table, said first group of switches are control switches for each of said tape recorders and are connected to a terminal device and said tape recorder receives a control signal for controlling the operating mode of the said corresponding tape recorder and receives a teaching signal source, a microphone for supplying a teaching signal to said tape recorder and for paging a pupil, said second group of switches connectable in parallel with other second group switches provided in the other control table, a common control terminal connected directly to said first and additional control tables for controlling the mode of all of said tape recorders at the same time, a common supply terminal directly connectible between said teaching signal source and said microphone and said supply terminals for supplying said teaching signal to all said tape recorders at the same time and for calling all pupils at the same time, and a common receiving terminal which is connectible with other common receiving terminals and connectible through other first control switches with corresponding other tape recorders.

3,969,832

TEACHING AID

Peter G. Garruto, 2791 Florida Ways Road, Apt. 107, Lake Worth, Fla. 33460

Filed Aug. 18, 1975, Ser. No. 605,297
Int. Cl.² G09B 1/28
U.S. Cl. 35—75 8 Claims



1. A teaching aid comprising

a. an open frame, said frame including a pair of generally parallel side legs, and top and bottom legs, said top and bottom legs being generally parallel to each other and generally transverse to said side legs,

b. a plurality of cooperating openings formed in said top and bottom legs,

c. a plurality of slide members received within cooperating openings in said top and bottom legs and reciprocal through said openings in a direction parallel to said side legs of said open frame, each slide member having a pair of opposite generally flat faces thereof, and each face having formed thereon a plurality of lines of indicia, each indicia line formed on one flat face of a given slide member having a corresponding indicia line formed in the same relative position on the opposite face of said given slide member, and

d. a pair of lenses extending from one of said side legs to the other between said top and bottom legs of said open frame, and for receiving said slide member therebetween, said lenses extending generally parallel to said top and bottom frame legs and generally perpendicular to the direction of movement of said slide members, one lens for cooperation with a given indicia on one face of a slide member while the other lens cooperates with the corresponding indicia on the opposite face of said given slide member.

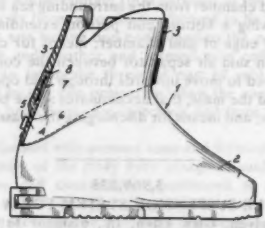
3,969,833

ARTICULATION DEVICE BETWEEN VAMP AND LEG, PARTICULARLY FOR SKI BOOTS

Franco Vaccari, Via Paleoveneti, 3, Montebelluna (Prov. Treviso), Italy

Filed July 5, 1974, Ser. No. 486,030
Claims priority, application Italy, July 10, 1973, 21832/73[U]
Int. Cl.² A43B
U.S. Cl. 36—117 1 Claim

1. Articulation device between vamp and leg, particularly for ski boots, comprising a pin with an enlarged head extending from the rear zone of a ski boot vamp and removably coupled with a slot provided in a central portion of the leg, guide means for the relative swing between said vamp and said leg, in which said guide means consist of a vertical rib extending to the rear of said vamp above said pin, said rib being arranged to engage with a corresponding vertically extending



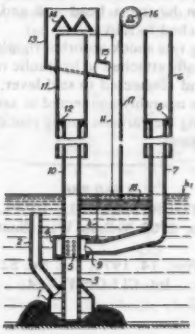
cavity formed inside said leg in a position above said aperture, the coupling between said rib and said cavity allowing only forward and backward swing of said leg with respect to said vamp.

3,969,834

AIRLIFT

Viktor Georgievich Geier, bulvar Pushkina, 33, kv. 3; Vladimir Ivanovich Gruba, bulvar Pushkina, 12, kv. 27; Nikolai Grigorievich Logvinov, Komsomolsky prospekt 25/111, kv. 34; Evgeny Vasilievich Uskov, ulitsa Artema, 58, kv. 35; Viktor Semenovich Kostanda, ulitsa Gornovaya 18, kv. 1, and Vladimir Georgievich Mirgorodsky, prospekt Metallurgov, 25, kv. 1, all of Donetsk, U.S.S.R.

Continuation of Ser. No. 387,129, Aug. 9, 1973, abandoned.
This application June 20, 1975, Ser. No. 588,954
Int. Cl.² E02F 3/88
U.S. Cl. 37—58 1 Claim



1. An airlift for lifting liquids and pulps from the bottoms of seas and rivers, comprising a submerged suction unit for sucking in a mass being transported which is a mixture of a liquid and solids; a mixer rigidly fixed to, communicating with said suction unit, and serving to mix the mass with compressed air; a partly submerged air duct rigidly fixed to said mixer for supplying the compressed air thereto; an air separator for separating the mass from the compressed air; a partly submerged pipeline respectively fixed to both said mixer and said air separator and extending below said mixer and said suction unit, for lifting the mass together with the compressed air from the former to the latter, and having an open end remote from said mixer; said air duct and said pipeline having vertical portions, each being made up by a pair of pipe sections, fitted one into the other for vertical movement relative to each other, and for simultaneously changing the combined lengths of said pipe sections; a lifting gear attached to the lower ones

of said pairs of pipe sections for simultaneous vertical movement thereof, for varying the combined length of said air duct and of said pipeline, for lifting said suction unit and said mixer; wherein said suction unit has a chamber open from below and communicating with a submerged feed pipe for supplying the liquid to said chamber from the surrounding sea and river, said pipeline having a bottom end portion extending below the open, lower edge of said chamber; means for causing phase separation in said air separator between the compressed air, that is allowed to move upwards through said open end of the pipeline, and the mass, that accumulates at the bottom of said air separator; and means for discharging the mass from said air separator.

3,969,835

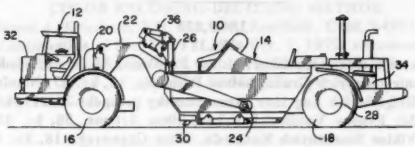
LOCKABLE SUSPENSION SYSTEM FOR A SCRAPER

Steven Erdelyan, Glen Ellyn, Ill., assignor to International Harvester Company, Chicago, Ill.

Continuation-in-part of Ser. No. 437,263, Jan. 28, 1974. This application Mar. 5, 1975, Ser. No. 555,643

Int. Cl.² E02F 3/62

U.S. Cl. 37—129 7 Claims



1. A lockable suspension system for a scraper having a tractor and a bowl pivotally connected and pivotally supported by wheels powered by an engine and a hydraulic jack attached to said bowl for controlling the vertical position of said bowl, said system comprising, in combination:

a lever pivotally attached to said hydraulic jack;

a hydraulic ram having a head end and a rod end, and pivotally attached to said lever;

a variable spring rate shock absorber rigidly attached to said tractor, pivotally attached to hydraulic ram, and pivotally supporting and connected to said lever; and

a control means operably connected to said hydraulic rams for neutralizing the variable spring rate shock absorber by locking said rams.

3,969,836

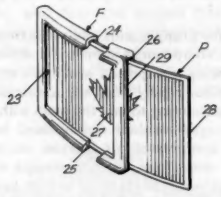
BUCKLE WITH REMOVABLE DISPLAY INSERT

Donald E. DuBois, 2700 Neilson Way, Santa Monica, Calif. 90405

Filed Nov. 14, 1974, Ser. No. 523,676

Int. Cl.² G09F 3/14

U.S. Cl. 40—21 C 1 Claim



1. The combination of a resiliently-planar display panel and a buckle including strap-attachment means, a generally upstanding support plate and frame-forming walls extending forward a short distance therefrom so as to spacedly overlie the forward face of the support plate, being disposed generally parallel thereto extending at least partially about the peripheral margin of the plate and forming a longitudinally-convex channel, open along one edge for sliding insertion and removable retention of said display panel, said panel being of lesser thickness than the channel whereby its resilience disposes it to seat by flexure toward a planar position in opposition to the curvature of the channel, with its rear face in general juxtaposition with the support plate, whereby such display panels can be interchanged in the channel without disturbing a functional position or use of the buckle.

3,969,837

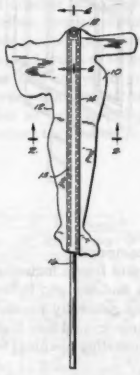
DISPLAY FIGURE

Suzanne Kresse, 7838 W. Ohio Ave., Milwaukee, Wis. 53219

Filed Mar. 6, 1975, Ser. No. 556,045

Int. Cl.² G09F 19/00

U.S. Cl. 40—126 R 2 Claims



1. A display comprising a flat figure panel made of material stiff enough to remain erect without being waved, said panel having uneven edges, an elongated backing strip attached to an intermediate portion of said figure panel to form with the portion of the panel to which it is attached a tube having one end open, said tube being disposed well within the outline of said uneven edges so as not to intrude thereon, an abutment closing the other end of the tube, a display supporting staff removably receivable through the open end of said tube and into contact with said abutment to define the fully inserted position of the staff, said abutment including a hang tab comprising an eyelet through the backing strip and panel.

3,969,838

SIGN

Charles T. Moore, Minneapolis, Minn., assignor to Dayton-Hudson Corporation, Minneapolis, Minn.

Filed Aug. 13, 1975, Ser. No. 604,138

Int. Cl.² G09F 7/02

U.S. Cl. 40—140 7 Claims

1. An interchangeable sign comprising:

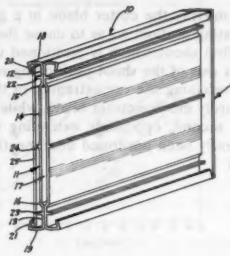
A. an elongated rectangular generally flat sign holder body having a pair of channel members disposed in back-to-back relation, each of said channel members having:

1. a back plate having flat top and bottom longitudinal edge portions lying in a common plane and a flat mid-portion displaced slightly outwardly therefrom, whereby, when said back plates are secured in back-to-back relation, a narrow tongue-receiving slot is formed between the mid-portions of the back plates,

2. a pair of flanges extending outwardly from the top and bottom edges of said back plate,

3. a lip extending inwardly from the free edges of said flanges,
4. a pair of parallel longitudinal ribs projecting from the top and bottom edge portions of said back plate spaced inwardly from the top and bottom flanges by a distance at least equal to the width of said lips, and
5. at least one further longitudinal rib projecting from the mid-portion of the back plate,

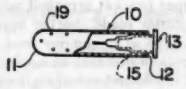
B. an end member at each end of said body, each of said end members having:
1. a generally flat plate lying in a plane perpendicular to the plane of the body, said plate having a width substantially equal to the combined width of the two



flanges at the top and bottom of the body and a length substantially equal to the width of the body, and
2. a generally flat longitudinal tongue projecting from one side of said end member plate, perpendicular thereto and spaced inwardly from the ends of the plate, said tongue being in engagement with the tongue-receiving slot at the end of the body, and

C. an interchangeable sign card held in at least one side of said sign holder body, said sign having indicia thereon and being formed from flat sheet material of generally the size and shape of the body to fit with a slide fit therein, the top and bottom edges of said sign card being retained by said flange lips and the back of said card being supported by said longitudinal ribs.

3,969,839
PORTABLE ELECTRIC LIGHT DEVICE
Moses Ziegler, 12638 Roselawn, Detroit, Mich. 48238
Filed May 23, 1975, Ser. No. 580,530
Int. Cl.² A01K *85/00*
U.S. Cl. 43—17.6 **1 Claim**



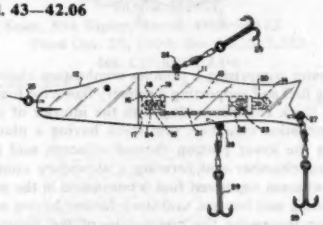
1. A portable electric light device comprising a body of non-conductive material having a long bore whose closed end is of small diameter, whose central part is of somewhat larger diameter, and whose open end is even larger and internally or female threaded;

a switching-sealing-closing cap having a male threaded projection formed complementary to the female threaded part of the body bore, whereby to provide a separable switch-seal-closing juncture of the cap and the body;

an electric light device in said body bore comprising a flashlight bulb formed to fit into the small part of the body bore and whose contact tip is exposed to the central part of the body bore; a conductor formed to lie in such central part and having one end joined to the contact tip of the bulb and another end formed as a coil spring and formed to lie in the threaded part of said bore to be engaged by the cap projection when the cap is threaded into the body bore, for switching and bore sealing, and closing;

a dry cell formed with contact ends and formed to lie in the central part of the body bore alongside said conductor, with one cell contact end positioned to engage the contact tip of the lightbulb when the cap projection is fully threaded into the body bore threaded part and biases the coil spring inner end into engagement with the other contact end of the cell, to make the circuit of spring-conductor wire-bulb-cell-spring; and to release the spring from the cell other end, when the cap projection is threaded at least partially outward from the body bore threaded part, to break the circuit, said body and cap being at least partially formed of translucent plastic so as to be illuminated by the lightbulb, and thus be effective as an illuminated lure, said cap projection having an axial bore receiving said spring and on inward movement of said cap, guiding said spring into contact with said dry cell.

3,969,840
FISHING LURE
John R. E. Charron, 106 Horace St., Winnipeg, Manitoba, Canada (R2H OV9)
Filed Jan. 20, 1975, Ser. No. 542,231
Claims priority, application Canada, Jan. 17, 1974, 190616
Int. Cl.² A01K *85/00*
U.S. Cl. 43—42.06 **4 Claims**

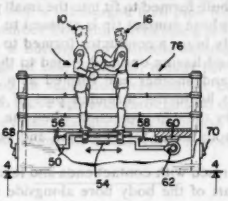


1. A fishing lure comprising in combination a hollow tube, closed at the trailing end, detachable closure means at the leading end and a hook element secured to said tube, said closure means including a hollow plug inserted by the inner end thereof into said leading end and being frictionally held therein with the outer end outside of said tube, said hollow plug being closed at the inner end and opened at the outer end thereof whereby the action of said lure moving through the water is influenced, and a tube piercing device secured to and extending from the inner end of said plug.

3,969,841
BOXING TOY
Lancelot Joseph, Lasalle, Canada, assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest
Filed Apr. 7, 1975, Ser. No. 565,854
Int. Cl.² A63H *13/06*
U.S. Cl. 46—268 **5 Claims**

1. A toy comprising first and second boxer representations disposed in facing relationship, each said representation being

carried on an elongated slide, each slide being carried for selective longitudinal reciprocating movement in general



alignment with each other, said apparatus further including electromechanical means for selectively moving said slides.

3,969,842

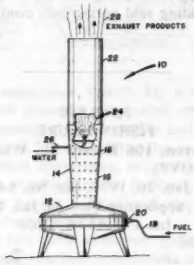
WATER INJECTION HEATER

Wallace W. Velie, Upland, Calif., assignor to Scheu Manufacturing Company, Upland, Calif.

Filed Oct. 8, 1974, Ser. No. 513,070

Int. Cl.[2] A01G *13/00*

U.S. Cl. 47—2 **5 Claims**



1. A heater comprising a primary combustion chamber for containing fuel and supporting a primary flame for fuel vaporization, a stack communicating with the interior of said primary combustion chamber, said stack having a plurality of louvers in the lower portion thereof adjacent said primary combustion chamber and forming a secondary combustion chamber wherein vaporized fuel is consumed in the presence of air entering said louvers, said stack further having an upper portion for increasing the convextion of the natural draft resulting from combustion, and water spray means mounted internally in said secondary combustion chamber and adapted to being connected to a pressurized water supply, said water injection means being directed upward for producing a water spray which is distributed into the combustion products to vaporize at least a portion of the water and produce a column of heated combustion products exiting said stack containing water which is substantially in the vapor state whereby the amount of water vapor in said combustion products is increased.

3,969,843

DEVICE FOR GRAFTING GRAPEVINES

Eugen Wahler, and Hans Wahler, both of Buchhaldenstr. 21, 7056 Weinstadt-Schnait, Germany

Filed Dec. 29, 1975, Ser. No. 645,214

Claims priority, application Germany, Oct. 21, 1975, 7533447[U]

Int. Cl.[2] A01G *1/06*

U.S. Cl. 47—6 **18 Claims**

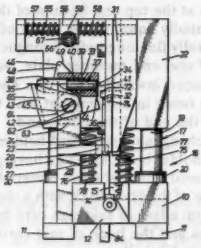
1. A device for grafting plant shoots, especiallly grapevines, by cutting and joining the extremities of scion and stock in a contoured joint in which the scion is held by the stock both longitudinally and in axial alignment, the device comprising in combination:

a stationary base plate having arranged thereon shoot positioning means defining a generally horizontal transverse shoot axis;

a vertically movable cutter blade of thin stock defining a generally vertical plane at right angles to the shoot axis and having a cross-sectional shape which produces a transverse cut on the shoots with a central bulge resembling the shape the Greek letter omega, so that cut extremities have matching tooth and tooth gap shapes, the cutter blade having a corresponding vertical fold profile defining a bead on one side and a groove on the other side thereof;

means for moving the cutter blade in a generally vertical reciprocating motion, so as to cause the cutter blade to sever a first shoot which is positioned underneath it, in the shoot axis of the shoot positioning means;

means for retaining the cut extremity of the first shoot on the upwardly moving cutter blade, while the cutter blade severs a second, oppositely extending shoot which has subsequently been positoned underneath it, in the shoot axis; and



means for releasing the first shoot from the cutter blade simultaneously with the second shoot, while joining the extremities of both on their shaped cuts, said releasing means including:

an upwardly movable ejector member arranged laterally adjacent to the fold profile of the cutter blade above the shoot axis;

a stationary stripper bracket arranged adjacent to the fold profile of the cutter blade, on the opposite side of the ejector member, so as to remove from the cutter blade any clipping or shoot that may be carried upwardly by the fold profile of the bladebyblockingtheupwardmovement of the clipping or shoot;

latching means for selectively blocking the upward mobility of the ejector member by engaging the latter at a level at which the blocked ejector member forcibly removes the previously retained first shoot from the upwardly moving cutter blade by blocking the upward movement of the former;

toggle means for alternatingly engaging the latching means against the ejector member, when the cutter blade performs a cut on the second shoot, and not engaging the latching means against the ejector member, when the cutter blade performs a cut on the first shoot.

3,969,844

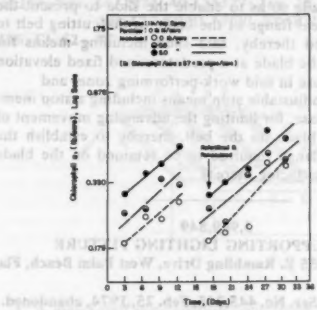
SOIL TREATMENT METHODS

Samuel Fogel, Newton; Patricia L. Foster, Cambridge; Paula Schenck, Boston, and William W. Walker, Jr., Allston, all of Mass., assignors to American Bioculture, Inc., Plumsteadville, Pa.

Continuation of Ser. No. 434,332, Jan. 17, 1974, abandoned, and a continuation-in-part of Ser. No. 421,527, Dec. 4, 1973, abandoned. This application May 1, 1975, Ser. No. 573,609

Int. Cl.[2] A01G 7/00

U.S. Cl. 47—58 9 Claims



1. A method of conditioning soil by binding the particles thereof into small workable aggregates which comprises inoculating the soil with a flocculant producing algae, maintaining in the inoculated soil available nitrogen, other nutrients and moisture in sufficient quantities so that the algae continue to multiply on the soil for a first period of time until a predetermined population density is reached, and thereafter maintaining in the inoculated soil plant nutrients other than nitrogen in quantities that are not growth limiting so that the algae continue to grow in a nitrogen deficient state in which soil aggregating compounds are produced.

3,969,845

DOOR CONSTRUCTION

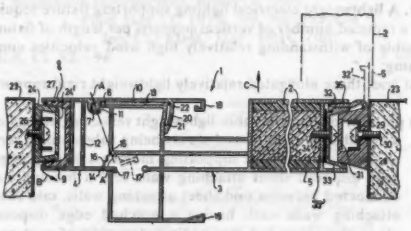
Leon Yulkowski, 4390 Derry Road, Bloomfield Hills, Mich. 48013

Filed Dec. 9, 1974, Ser. No. 530,958

Claims priority, application Germany, Feb. 11, 1974, 2406428

Int. Cl.[2] E05B 65/06

U.S. Cl. 49—394 15 Claims



1. In a combination door and locking mechanism, wherein the door is hingedly connected to a door frame along one of its major longitudinal sides and the locking mechanism is operably connected to the opposed major longitudinal side of the door, the improvement of:

said locking mechanism including a longitudinal engaging element carried by said opposed door side and being hingedly mounted about a pivot axis which is generally parallel to the door hinge axis;

a corresponding longitudinal counter-element connected to a door frame and being generally parallel to and engageable with the engaging element;

said engaging element and counter-element extending substantially the entire height of the opposed door side;

said engaging element being channel-shaped in cross section and including a pair of spaced, longitudinal, substantially parallel projections extending away from the door;

said counter element being comprised of a male-shaped member nesting within said projections when the door is in the closed position;

said engaging element being in substantial planar alignment with the door when the door is in the closed position and being sufficiently pivotal in a direction opposite the door pivotal movement to pivot one of said projections out of lateral alignment with said counter element so that the door may open relative to the frame;

over center means for biasing said engaging element (a) in a closed position in substantial planar alignment with the door and nesting with the counter-element when the door is closed and (b) in a pivoted position whereby one of said projections is out of lateral alignment with the counter-element when the door is opened;

stop means carried by the door and movable therewith for restraining pivotal movement of the engaging element in one direction beyond the closed position;

blocking means operably connected with the door and selectively engageable with said engaging element for preventing pivotal movement thereof for locking the door in the closed position; and

door opening means carried by said opposed door side and being pivotally mounted thereto, said opening means being operable with the engaging element for effecting pivotal movement of said engaging element upon manual operation of the opening means.

3,969,846

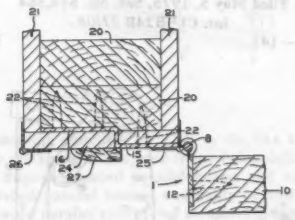
DOOR HINGE

Delbert Scott, 594 Ripley, Akron, Ohio 44312

Filed Oct. 23, 1974, Ser. No. 517,323

Int. Cl.[2] E06B 1/04

U.S. Cl. 49—504 1 Claim



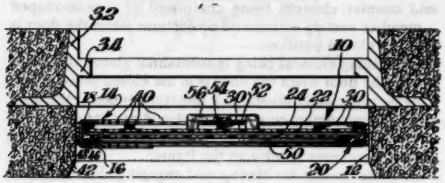
1. A door assembly comprising a hinge member having a pair of leafs, one of said leafs attached to a door, the other of said leafs having a first planar portion and a second planar portion spaced from but parallel to said first portion, an interconnecting portion connecting said first portion to said second portion, bores in each of said first and second portions for receiving screws for attaching said other leaf to a door framing stud, said screws of said first portion and said second portion having their central longitudinal axes parallel to each other, hinge means interconnecting said leafs, a plaster board member interposed between said first portion and said stud, plaster board means secured to said stud and overlaying said second portion of said other hinge leaf, and an elongated door stop attached to said plaster board means.

3,969,847

COMBINATION MANHOLE CLOSURE ASSEMBLY AND SEPARATE SUPPORT RING

Benjamin J. Campagna, Newark, Del., and Samuel A. Campagna, Jr., Deptford, N.J., assignors to Benjamin J. Campagna, Newark, Del.

Filed Nov. 18, 1974, Ser. No. 524,537
Int. Cl.² E02D 29/14
U.S. Cl. 52—1 11 Claims



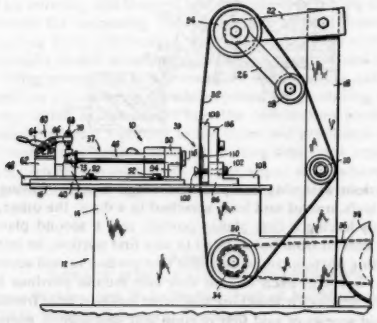
1. The combination of a manhole closure assembly for preventing storm water from entering into a manhole opening and a separate support ring for the assembly including a lower closure supporting flange, an upper flange spaced therefrom, and sealing means on the lower flange, the closure assembly including a substantially circular cover plate the arcuate edge portions of which engage the sealing means on the lower flange and the cover plate comprising a pair of semi-circular segments, means for holding the semi-circular segments of the cover plate together at their diametral edge portions while allowing movement of at least one segment about a substantially horizontal axis in close proximity to its diametral edge portion, and spaced apart biasing means along the arcuate edge portions of the cover plate extending between the plate and the upper flange of the support ring for urging the plate against the sealing means until a pressure force acting upon the underside of the cover plate exceeds the force of the biasing means whereby the arcuate edge portions of the cover plate lift away from the sealing means to relieve such pressure force.

3,969,848

TURBINE BLADE AIR SEAL EDGE GRINDER

Ralph T. DeMusis, 1 Commercial St., Branford, Conn. 06405

Filed May 5, 1975, Ser. No. 574,564
Int. Cl.² B24B 21/08
U.S. Cl. 51—141 10 Claims



1. A machine for refinishing the end edges of air seal flanges which are located at the extremities of turbine blades and which have been resurfaced by welding, comprising in combination:

a. a stationary base,

b. a contoured back-up shoe affixed to the base at a work-performing station thereon and having a contoured surface fixedly disposed in a work-performing zone,

c. an abrasive belt having a surface provided with cutting particles,

d. means for driving said belt over the back-up shoe with the back of the belt engageable with the shoe, said belt being capable of yielding upon said engagement and conforming to the shape of the contoured surface,

e. a slide movable over the base toward and away from said shoe at the work-performing station,

f. a clamping device carried by the slide, adapted to clamp a turbine blade so as to enable the slide to present the resurfaced seal flange of the blade to the cutting belt to be resurfaced thereby, said slide including means for positioning the blade at a predetermined fixed elevation above the base in said work-performing zone, and

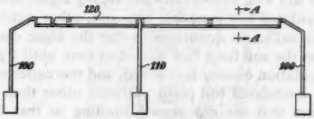
g. cooperable adjustable stop means including a stop member on the base, for limiting the advancing movement of the turbine blade on the belt, thereby to establish the amount of flange required to be retained on the blade after the resurfacing thereof.

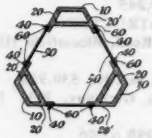
3,969,849

SELF-SUPPORTING LIGHTING FIXTURE

D. E. Franklin, 555 E. Rambling Drive, West Palm Beach, Fla. 33406

Continuation of Ser. No. 445,245, Feb. 25, 1974, abandoned.
This application May 12, 1975, Ser. No. 576,665
Int. Cl.² F21V 21/00; E04H 14/00
U.S. Cl. 52—28 4 Claims





1. A lightweight electrical lighting supporting fixture requiring a reduced number of vertical supports per length of fixture capable of withstanding relatively high wind velocities comprising:

at least three elongated relatively lightweight rigid supporting members;

a plurality of relatively thin lightweight reflecting elongated metal sheets, each of said sheets being substantially rectangular, each of said supporting members having angularly disposed sheet attaching walls and a bracing wall connected between said sheet attaching walls, said sheet attaching walls each having a notched edge disposed along the elongated longitudinal direction of said supporting member, said notched edges having a gap substantially equal to the thickness of one of said sheets, said supporting members disposed such that adjacent supporting members have adjacent sheet attaching walls disposed in a common plane enjoined together by one of said reflective thin sheets lying in said common plane, said sheet longitudinal edge portion being disposed in adjacent wall attaching notches;

a plurality of fasteners connecting said thin sheets to said supporting members; and

at least two rigid frames, each of said frames connecting said supporting members together.

3,969,850

METAL ROOF CONSTRUCTION

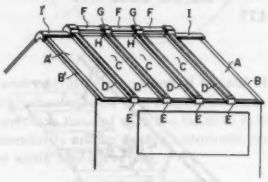
Takashi Hirai, Ukita, Japan, assignor to Kabushiki Kaisha Hirai Giken, Tokyo, Japan

Filed Feb. 27, 1975, Ser. No. 553,507

Claims priority, application Japan, Apr. 17, 1974, 49-42323; Nov. 26, 1974, 49-135127; Jan. 18, 1975, 50-8245

Int. Cl.² E04D *13/00*; E04B *1/74*

U.S. Cl. 52—97 4 Claims



1. A metal roof construction comprising a metal roof unit which includes a backing, a surface metal plate having a series of notches therein and a heat insulating material disposed integrally between said backing and said surface metal; a joint member having a series of slits therein for jointing said surface metal plate of one said metal roof unit with a said surface metal plate of a neighbouring metal roof unit, by means of nails that are driven through said notches in said surface metal plate and said slits in said joint member into a rafter on which said metal roof unit is held at each fringe of said connecting extensions, said series of notches being located to coincide with another series of said notches provided at the fringe of a neighbouring one of said metal roof units so as to make said metal roof unit and said joint member movable due to heat expansion, said metal roof unit having a pair of vertical rising portions and connecting, extensions at each opposite ends, said connecting extensions of adjacent metal roof units being at least partially overlapped; and a covering member which covers said joint member.

3,969,851

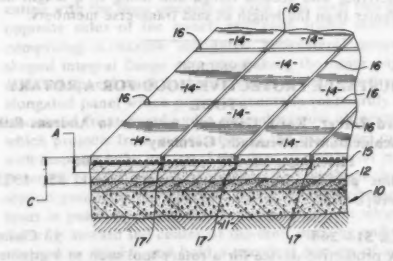
ARCHITECTURAL PAVING SYSTEM WITH INDIVIDUAL CONTROL JOINT PAVING

Daniel C. Whitacre, Massillon, Ohio, assignor to Structural Stoneware Incorporated, Minerva, Ohio

Filed July 11, 1975, Ser. No. 595,026

Int. Cl.² E04C *1/28*; E01C *7/00*

U.S. Cl. 52—98 7 Claims



1. In an architectural paving system the combination of a setting bed laid wet upon and supported by a base without becoming firmly attached to said base when the bed has finally set, thin architectural pavers laid on the top of said bed, an adhesive bond coat interposed between the top of said bed and the bottoms of said pavers while the bed is green, said coat firmly attaching said pavers to said bed when the bed has finally set, said pavers being arranged on said bed in patterns as desired and spaced from each other with gaps between the sides of adjacent pavers, said bed having downward cuts made while the bed is green and made downwardly through said gaps and through any part of said coat in a gap and extending below said gaps to an appreciable depth all around and below the peripheries of the pavers, said cuts tending to confine cracking of said bed, after it has set and been subjected to external stress sufficient to cause said cracking, to cracks which extend downwardly in substantially the vertical direction of said cuts, each parametric continuity of such cracks which extend the full depth of the bed tending to define a fractured-out, monolithic block comprising a whole flawless paver integrated with the part of the setting bed subjacent thereto.

3,969,852

SELF-SUPPORTING SHEETING PANEL FOR TRENCHES OR THE LIKE

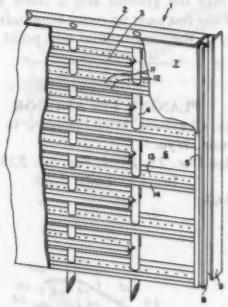
Josef Krings, Hans-Boeckler Str. 23, D 5138 Heinsberg, Oberbruch, Germany

Filed Sept. 4, 1974, Ser. No. 503,091

Claims priority, application Germany, Sept. 12, 1973, 2345859

Int. Cl.² E02D *5/74*; E04H *17/22*

U.S. Cl. 52—155 4 Claims



1. A sheeting panel for trenches or the like comprising a generally rectagular frame, said frame being defined by horizontally disposed spaced parallel beams and vertically disposed spaced parallel beams, a plurality of horizontally disposed spaced parallel reinforcing members disposed between said horizontal beams and defining therewith a plurality of chambers, said reinforcing members being fixed to said vertical beams, a plurality of vertically disposed spaced parallel tubes disposed between said vertical beams, said tubes being fixed to said horizontal beams, a pair of cover plates secured to opposite faces of said frame beams, foam plastic filling said chambers, reinforcing means embedded in said foam plastic whereby the sheeting panel is reinforced for resisting loads placed thereon by earth when used for shoring trenches or the like, said reinforcing means consists of steel cord waste, vertically extending channel guide means secured to each vertical beam for vertically guiding the sheeting panel relative to posts associated therewith in a trenching environment, and each guide channel means being a vertically extending guide channel defining a generally U-shaped opening which faces laterally outwardly of said sheeting panel.

3,969,853

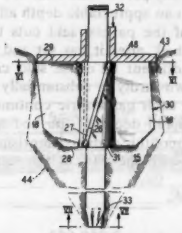
TORQUE FIN ANCHOR

Robert F. Deike, Cheyenne, Wyo., assignor to Foresight Industries, Cheyenne, Wyo.

Filed Feb. 3, 1975, Ser. No. 546,335

Int. Cl.[2] E02D 5/80

U.S. Cl. 52—156 3 Claims



1. A ground anchor adapted to anchor a cable or support a post which comprises a hollow central pile slidable over said post, a plurality of circumferentially spaced planar fins with tapered front portions radially secured along their length to said pile and inclined in the same direction relative to the longitudinal axis thereof at substantially the same clockwise angle with respect to the longitudinal axis, and said fins having large surface areas confronting and compacting the ground to resist shifting and retraction of the anchor under load and which cause said anchor to rotate slightly to minimize restriction of entry into the ground and a cable attachment hole through one of the fins near an outer longitudinal edge thereof and rearwardly of the longitudinal mid point of said fin.

3,969,854

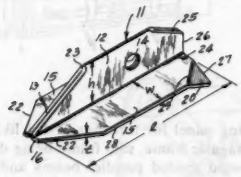
PLANING FIN ANCHOR

Robert F. Deike, Cheyenne, Wyo., assignor to Foresight Industries, Cheyenne, Wyo.

Filed Dec. 23, 1974, Ser. No. 535,428

Int. Cl.[2] E02D 5/80

U.S. Cl. 52—163 3 Claims



1. A ground anchor for underground submergence comprising an elongated rigid member having a small frontal surface area with a pointed leading end for ease in inserting the member lengthwise in the ground, a large longitudinal planar surface area for restricting retraction from the ground having downturned fins on the trailing end and an upturned longitudinal central web, and a cable attached to the web sufficiently rearwardly of the longitudinal midpoint of the member to provide about 55% of the area of the member forwardly of the cable and in substantial laterally offset relation from the large longitudinal planar surface area thereof, said cable freely suspending the member in an inclined position with the pointed end below the level of the trailing end, and said cable being operable from above ground to pull the submerged member causing the pointed end to plough into the ground while the fins rotate the member from a lengthwise to an inclined transverse position with the pointed end below the level of the trailing end presenting the large planar surface thereof to the ground above the member and providing a large area of earth above the planar surface holding the member submerged in the ground to anchor tension applied to the cable.

3,969,855

MOVABLE PLATFORM FOR PARKING ONE VEHICLE ABOVE ANOTHER

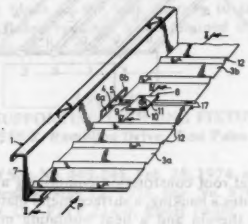
Ulrich Lendi, Stafa, Switzerland, assignor to Mageba S.A., Switzerland

Filed Aug. 23, 1974, Ser. No. 500,197

Claims priority, application Germany, Aug. 25, 1973, 2342987

Int. Cl.[2] E04B 5/10

U.S. Cl. 52—177 6 Claims



1. A platform assembly, for use in apparatus for parking one vehicle above another, comprising:

i. two transversely-spaced longitudinal struts, each strut including a vertical wall, a first flange extending outwardly from the upper edge of said vertical wall, a second flange extending inwardly from the lower edge of said vertical wall and having an upwardly extending free end;

ii. a plurality of transverse members disposed in spaced relationship and extending between said struts, said transverse members being rectangular hollow section members with a longitudinal slot in the top wall thereof, said transverse members overlying at each end the second flange of a respective strut, said transverse members having at each end a flange secured to the vertical wall of the respective strut, said transverse members having a drainage aperture adjacent each end in the portion thereof overlying the second flange;

iii. a plurality of metal base plates disposed on said transverse members in a row longitudinally of the struts, said base plates extending transversely for substantially the entire width between the vertical walls of the two struts, said base plates having at each of their transverse edges a downwardly bent edge portion engaging into the slot of a transverse member, said base plates at least partially overlying said second flange and being of a length not greater than the length of said transverse members.

3,969,856

ADJUSTABLE PROTECTIVE HOOD FOR A ROTARY TOOL

Gerhard Zerrer, Korb, Germany, assignor to Andreas Stihl Maschinenfabrik, Neustadt, Germany

Filed Sept. 20, 1974, Ser. No. 507,806

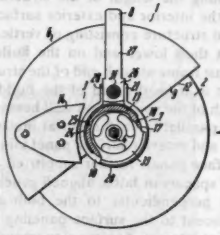
Claims priority, application Germany, Sept. 25, 1973, 7334640[U]

Int. Cl.[2] B24B 55/04; B27G 19/04

U.S. Cl. 51—268 15 Claims

1. A protective device for a rotary tool such as a grinding wheel comprising; a hood having a peripheral portion surrounding a portion of said tool in radially spaced relation thereto, said hood having side walls at the sides of said tool

and connected to said peripheral portion, stationary means engaging one of said side walls and supporting said hood for pivotal movement substantially on the axis of said tool, clamp means operable to clamp said hood in adjusted positions of pivotal movement thereof, and a lever pivotally connected to



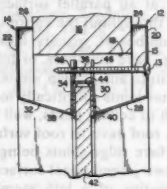
said hood and operatively connected to said clamping means and operable when moved in a respective direction about the pivotal connection thereof with the hood to release said clamp means momentarily and to permit automatic movement of the hood in the same said direction.

3,969,857

TAMPER-PROOF WINDOW UNIT

Carroll G. Stark, North Hollywood, Calif., assignor to Anemostat Products Division Dynamics Corporation of America, Scranton, Pa.

Filed Oct. 15, 1975, Ser. No. 622,758
Int. Cl.² E06B 3/58, 3/26
U.S. Cl. 52—208 **12 Claims**



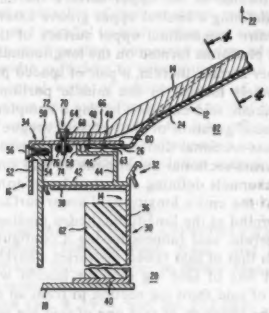
1. A tamper-proof window unit for assembly in multi-lateral openings in doors and the like; said unit comprising similar first and second multilateral centrally open frame members adapted to be mounted about an opening respectively on opposite sides of a door, each of said frame members comprising a narrow elongated multilateral front panel extending generally in a plane parallel to the door and marginally about the door opening with an outer edge portion partially overlapping the door adjacent the opening, the front panel of said first frame member having a small front to rear opening communicating with the door opening in each of at least two generally opposite sides of the panel, and each frame member also comprising a narrow elongated multilateral generally L-shaped integral flange extending along the inner edge of its said front panel, each L-shaped flange including a first narrow elongated panel which projects generally rearwardly from its associated front panel and a second narrow elongated panel which projects from a rear edge of the first panel outwardly with respect to the center of the door opening and in a plane generally parallel with the door faces and front panels, the two second panels on the opposite frame members being spaced apart in parallel relationship to define a groove which opens inwardly toward the center of the door opening and which is adapted to receive and hold a marginal portion of a pane of glass, a pane of glass disposed in the door and frame opening with a marginal portion thereof entered in said groove, said second panel of one of said frame members having an outer and free edge portion divided into first and second sections along each of at least two generally opposite sides of the panel, each first section being arranged substantially at right angles with the panel and projecting rearwardly toward the second panel on the other frame member and adjacent the marginal edge of the pane of glass, and each second section residing substantially in the plane of the panel, each of at least two generally opposite sides of said second panel of said second frame member having a small front to rear opening therein, said two front to rear openings being aligned in front to rear relationship respectively with the two openings in said front panel sides of said first frame member, and two screws entered and threadably engaged respectively in said aligned openings and serving to secure the window unit and door in assembly with said outer edge portions of said two front panels clampingly engaging opposite sides of the door adjacent its opening and with said two second panels clampingly holding the marginal portions of the pane of glass.

3,969,858

EXPLOSION VENT CONSTRUCTION

Edward Sidney Naidus, Glen Rock, N.J., assignor to RCA Corporation, New York, N.Y.

Continuation of Ser. No. 458,187, April 5, 1974, abandoned.
This application June 20, 1975, Ser. No. 588,862
Int. Cl.² E04B 7/18
U.S. Cl. 52—232 **2 Claims**



1. A building explosion venting apparatus for enclosing an explosion vent opening comprising:

a curb defining said opening and having a plurality of pin receiving apertures spaced in a predetermined array,

a flexible thermoplastic skylight sheet member releaseably secured to said curb for enclosing said opening, said curb and sheet member being arranged for the release of said sheet member from said curb when said sheet member is forced in a given direction toward the building exterior by an explosion occurring within the building,

a rigid brace member disposed across said opening, said sheet member being disposed between said brace member and the building interior, said brace member including a portion juxtaposed with said apertures, and

a plurality of elongated pins extending from said brace member portion in a direction opposite said given direction and disposed in said given array in slideable engagement with said pin receiving apertures for releasing upon the occurrence of said explosion, said apertures and said pins being arranged to jam said pins in said apertures when said brace member receives a force in a direction different than said given direction thereby preventing the release of said sheet member in the presence of an ambient force in said different direction.

3,969,859

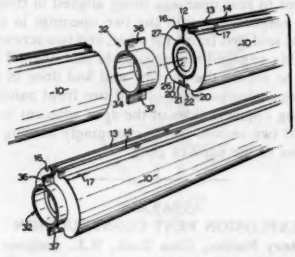
PREFABRICATED BUILDING LOG SECTIONS

Thomas Bruce Hisey, Thornhill, Canada, assignor to Homestead Logs Limited, Thornhill, Canada

Continuation-in-part of Ser. No. 467,340, May 6, 1974, abandoned. This application Feb. 14, 1975, Ser. No. 550,086

Int. Cl.[2] E04B *1/10*

U.S. Cl. 52—233 10 Claims



1. In a wall structure of a log building comprising at least two log sections joined together end-to-end, and said log sections being interfitted with at least a third log section in a superposed manner, each of said log sections and third log section having a pair of spaced parallel longitudinal tongue members formed in the upper surface therein, said tongue members defining a central upper groove extending throughout the entire longitudinal upper surface of the log section, two raised platforms formed on the longitudinal edge portions of the upper surface therein, a pair of spaced parallel longitudinal channels formed in the middle portion of the lower surface therein, said channels having a complementary cross-sectional configuration of that of said tongue members and having cross-sectional dimensions at least equal to or larger than the cross-sectional dimensions of said tongue members and said channels defining a central lower tongue extending throughout the entire longitudinal lower surface therein, two rabbets formed at the longitudinal edge portions of the lower surface therein, said rabbets having a configuration complementary to that of said raised platforms whereby said rabbets of at least one of said log sections interfit with said raised platforms of said third log section to form an enclosed space between the channels of said one of said log sections and the tongue members of said third log section, each of said log sections and third log section having a center bore extending throughout their respective entire longitudinal central portion, a circular groove formed at the end surfaces of each of said log sections and third log section, said circular groove encircling the end portions of said center bore therein, said circular groove having two diametrically opposite radial grooves extending radially outward from said circular groove and extending to the bottom surface of said central upper groove and central lower tongue respectively.

3,969,860

THERMAL EFFICIENCY STRUCTURE

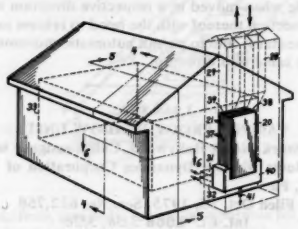
Richard Paul Bentley, Mount Arab, N.Y. 12986

Filed July 31, 1974, Ser. No. 493,616

Int. Cl.[2] E04B *1/00, 1/74*

U.S. Cl. 52—261 1 Claim

1. A thermal efficiency structure with interior and exterior surfaces consisting of airtight, moisture proof, structural panels, said surfaces spaced apart from each other with built-up beams, said beams comprising the only internal structural connection between interior and exterior surfaces with such connection between interior and exterior surfaces being required to provide structural strength and rigidity, and said beams composed of two edge members attached to, and held apart from each other, by at least one connecting panel or by bridging members, said beams arranged in a series of frames standing vertically on the building plate, each frame usually consisting of one floor beam, two side wall beams, and one roof beam assembled together into the configuration of a cross section of the structure and said beams in each frame connected to each other with gussets, said frames spaced parallel to each other along the length of the structure at intervals coincident with the interior and exterior surface panel joints, end walls for said structure consisting of vertically positioned beams resting at their lower end on the building plate and attached to the last frame at each end of the structure, said last frames being set in from the end of the building a distance equal to the width of the vertical end wall beams, said end wall beams arranged parallel to each other at intervals coincident with the interior and exterior surface panel joints, said interior and exterior surface panels further supported and reinforced with a system of spacers or laths, aligned generally parallel to each other and perpendicular to the built-up beams, and immediately adjacent to the surface paneling in walls, floor, ceiling, and roof at intervals necessary to impart rigidity to the



surface panels and at all parallel surface panel joints, said surface panel joints throughout the entire structure located on and joined to built-up beams, spacers, laths, corner members, building plate, ridge, eave members, or filler pieces such that all said joints constitute airtight lap joints, said surface panel lap joints at all corner joints specifically including side wall to end wall joints, wall to ceiling joints, wall to floor joints, wall to roof eave joints, roof eave to roof surface joints, and roof surface to roof surface ridge joints being made through the attachment of the two joined panel surfaces to a single structural member consisting of a lath member, building plate member, eave member, ridge member, or corner member, said lap joints being made using nails and an airtight adhesive bond, said surface paneling and mechanically strong airtight lap joints being continuous over the entire structure interior and exterior surface and across the edges of door, window, and other openings which connect interior and exterior surfaces, said continuous surface paneling and airtight lap joints providing a highly airtight structure, and further, the space between said interior and exterior surfaces filled with a thermal insulating material.

3,969,861

LEAKPROOF ROOF AND METHOD OF CONSTRUCTING SAME

Edward J. O'Hanlon, Assembly Point, Lake George, N.Y. 12845

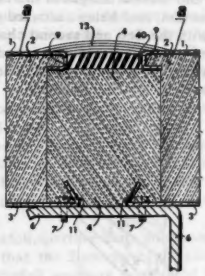
Filed June 17, 1974, Ser. No. 480,600

Int. Cl.[2] E04B *1/68, 1/80;* E04D *1/36*

U.S. Cl. 52—309 6 Claims

1. A substantially non-expanding and non-contracting roof or top cover of a building or part thereof, on which rain, hail, snow or ice accummulates and which is subject to the wide seasonal changes in temperature but which is without any roof cover covering said roof as a whole, said roof comprising similar flat panels, each panel composed of rigid foam held tightly between two sheets with hard surfaces, said panels resting on and fastened to purlin, and at right angles to said

purlin, said flat panels being closely adjacent to each other, and placed in lines end-to-end and closely side-by-side, the contiguous ends of adjacent panels fastened firmly to the same purlin, and means closing and waterproofing the narrow spaces between the sides and the ends of said panels by being



further joined laterally and longitudinally by a secondary application of foam substantially filling the crosswise and lengthwise spaces between the panels and, and an elastic cover positioned on and waterproofing over said secondary application of foam.

3,969,862

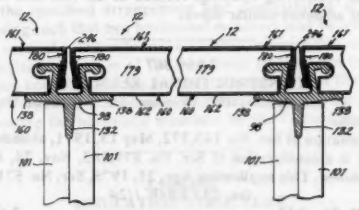
BUILDING CONSTRUCTION AND METHOD

Robert Kuss, c/o Production Specialties, Inc., 1020 Ford St., West Conshohocken, Pa. 19428

Division of Ser. No. 171,896, Aug. 16, 1971, Pat. No. 3,807,100. This application Feb. 20, 1974, Ser. No. 444,085

Int. Cl.[2] E04B *1/74*

U.S. Cl. 52—404 **7 Claims**



1. A surface construction comprising a panel, said panel comprising inner surface means and outer wall means, said inner surface means comprising a first web, said first web including opposed generally upstanding portions at its ends, said upstanding portions supporting substantially flat faces, each of said substantially flat faces supporting a downwardly directed leg the lower edge of which comprises a reverse bend, said outer wall means comprising a second web in overlying relation to said first web, opposed downwardly directed legs extending from said second web, said last named legs including a free edge which is received in said reverse bend, the distance between said second web and said free edge being large enough so that said first web and said substantially flat faces will be spaced from said second web to define an insulation zone therebetween.

3,969,863

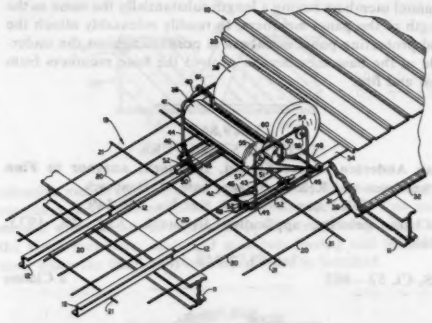
ROOF SYSTEM

Robert J. Alderman, Rte. 1, Box 205E, Ruskin, Fla. 33570

Filed Aug. 2, 1974, Ser. No. 494,097

Int. Cl.[2] E04B *2/28, 2/60;* E04F *21/00*

U.S. Cl. 52—407 **8 Claims**



1. In a roof structure comprising a plurality of spaced rafters oriented parallel to one another, a plurality of approximately equally spaced purlins mounted on said rafters and oriented parallel to one another and perpendicular to said rafters, each of said purlins including an upwardly extending central web and at least one laterally extending lower flange, the improvement therein of a plurality of support straps oriented parallel to one another and parallel to said purlins and resting on said rafters between said purlins, elongated strips of insulation material of a width sufficient to substantially span the space between the central webs of adjacent ones of said purlins positioned between and extending parallel to said purlins and resting on said support straps and on the lower flanges of said purlins, and sheets of roofing material mounted on said purlins and extending over said strips of insulation material.

3,969,864

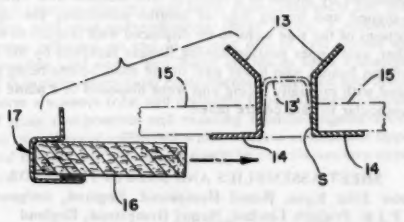
FIRE RESISTANT CEILING CONSTRUCTION

Fred J. Stephenson, Overland Park, Kans., and Donald J. Rush, Grandview, Mo., assignors to Butler Manufacturing Company, Kansas City, Mo.

Filed Oct. 4, 1974, Ser. No. 512,068

Int. Cl.[2] E04B *5/57;* E04C *1/36*

U.S. Cl. 52—475 **8 Claims**



1. A fire resistant space grid ceiling system, comprising: a plurality of steel space trusses arranged to form a rectangular space grid ceiling construction, said trusses having base members with opposite, horizontally outwardly extending flanges thereon; rectangularly shaped, fire resistant ceiling panels supported at their opposite edges on top of said flanges in spanning relationship to adjacent base members and leaving exposed therebeneath a lower portion of the base members; rectangularly shaped, fire resistant grid protecting panels having a width substantially the same as the width of the exposed portion of the base members and secured to the underside of the flanges of the base members; and separate,

elongate channel members having a generally vertical wall with top and bottom edges and generally horizontal top and bottom walls on the top and bottom edges of the vertical wall, the bottom wall thereof engaged under an adjacent edge of the grid protecting panel and the top wall thereof engaged directly over and against an adjacent flange of a base member, the channel members having a length substantially the same as the length of the panel members, to readily releasably attach the grid protecting panel members in position against the underside of the base members to protect the base members from heat and fire.

3,969,865

CEILING STRUCTURE

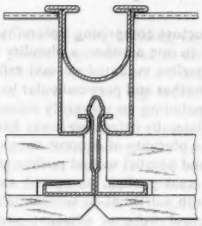
Finn Andersen, Greve Strand, Denmark, assignor to Finn Andersen and Keld Andersen, both of, Denmark

Filed Aug. 26, 1974, Ser. No. 500,549

Claims priority, application Denmark, Aug. 29, 1973, 4746/73

Int. Cl.² E04B 5/52

U.S. Cl. 52—483 **2 Claims**



1. A ceiling structure of the type having a plurality of adjoining ceiling sheets having two mutually parallel grooves, said ceiling sheet being supported by suspension means shaped as in inverted T, the lower part of the suspension means being provided with protruding suspension portions, and the upper part of said suspension means being thickened, said suspension means being secured to a plurality of main beams being symmetrical with regard to a longitudinal central plane and at their lower parts being provided with resiliently movable end webs facing each other and their upper parts engaging parts of transverse suspension beams, characterized by each of the main beams having two side webs mutually connected by means of a resilient intermediate web which is U-shaped and having legs of lengths permitting the upper portions of the side webs to be displaced with respect to each other, said upper portion having flanges received by the suspension beams, said lower part of the main beams being provided with mutually facing end webs disposed in a plane perpendicular to said centre plane.

3,969,866

SHEET ASSEMBLIES AND SHEETS THEREFOR

Peter John Kyne, Hemel Hempstead, England, assignor to P.J.K. Projects Limited, Hemel Hempstead, England

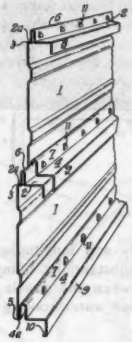
Filed Apr. 11, 1974, Ser. No. 459,927

Claims priority, application United Kingdom, Apr. 16, 1973, 18223/73; July 25, 1973, 35344/73

Int. Cl.² E04C 1/10

U.S. Cl. 52—588 **8 Claims**

1. A fabricated rigid sheet profiled for engagement with an adjacent similar sheet for assembly as a panel, the sheet being of substantially rectangular shape and having a first flange extending rearwardly of one longitudinal edge, a first fold connecting said first flange to said one longitudinal edge and providing a first U-shaped channel, a second flange of greater width than said first flange and extending rearwardly of a second longitudinal edge opposed to said one longitudinal edge, a second fold connecting said second flange to said second longitudinal edge and providing a second U-shaped channel, a third flange extending in one direction from the rear longitudinal edge of said first flange and substantially parallel to the general plane of the sheet, a fourth flange extending in said one direction from the rear longitudinal edge of said second flange and substantially parallel to the general plane of the sheet, said first and second folds extending from the respective first and second flanges in the direction opposite to said one direction, and being rearward of the general plane of the sheet with the first and second channels opening in said one direction and being so dimensioned that the first fold is engageable within the second fold of an adjacent similar



sheet by relative displacement of the sheets in the general plane thereof to locate the adjacent sheets with the first flange against and in supporting engagement with the second flange of the adjacent similar sheet, a first plurality of spaced openings in the wall of said second fold remote from the general plane of the sheet, a second plurality of spaced openings in the wall of said first fold remote from the general plane of the sheet located to register with said openings in the second fold of an adjacent similar sheet, a strip dimensioned to be received within said first fold and a plurality of projections integrally formed with said strip and dimensioned to extend into the registering openings formed in the first and second folds of adjacent similar sheets.

3,969,867

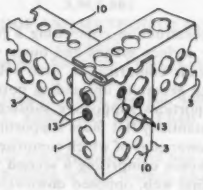
CONSTRUCTIONAL ELEMENT

James A. MacKenzie, 100 Bronson Ave., Ottawa, Ontario, Canada

Continuation of Ser. No. 143,272, May 13, 1971, abandoned, which is a continuation of Ser. No. 879,183, Nov. 24, 1969, abandoned. This application Apr. 25, 1975, Ser. No. 571,862

Int. Cl.² E04B 1/24

U.S. Cl. 52—633 **2 Claims**



1. A constructional element of constant L-shaped cross-section comprising two flanges of uniform thickness which merge at right angles in which one flange is wider than the other and wherein:

a. the narrower width flange contains a first longitudinally extending row of alternating circular and quatrefoil apertures;
b. the wider of said flanges contains an inner and at least one additional longitudinally extending row of alternating circular and quatrefoil apertures which have the same dimensions as the circular and quatrefoil apertures in said first row;
c. the apertures in each row in said wider flange are transversely aligned, the circular apertures in one row in said flange being transversely opposite the quatrefoil apertures in the other row in said wider flange, and wherein
d. the centre lines of two rows of apertures in said wider flange are transversely spaced a distance equal to the centre-to-centre distance between adjacent apertures in any of said rows;
e. the lengthwise centre-to-centre distance between adjacent apertures in each row in each flange is the same;
f. the centre line of each row of apertures adjacent the line of merger of the two flanges is equidistant from said line of merger;
g. each quatrefoil aperture has a minimum dimension which is not less than the diameter of the circular apertures;
h. each quatrefoil aperture is defined by four regularly arranged, congruent, arcuate curves, each curve having a radius substantially equal to the radius of the circular apertures;
i. each quatrefoil aperture has two equal maximum dimensions, each said maximum dimension being substantially equal to the diameter of a circular aperture plus twice the thickness of said flange;
j. said maximum dimensions extending longitudinally and transversely of the element;
k. the apertures in each row being transversely aligned, the circular apertures in one row being transversely opposite the quatrefoil apertures in the next adjacent row; and wherein
l. there is a small radius of curvature at the junction between the two flanges and in which the centre lines of each of said first row and said inner row of apertures are the same distance from the inner surface of the opposing flange, said distance in each case being equal to the sum of (a) the lengthwise centre-to-centre distance between adjacent apertures in said rows, plus (b) the thickness of said element, plus (c) said small radius;
m. the specified arrangement and configuration of holes being such that two horizontal members may be joined to a vertical member to make a corner construction with the horizontal flanges of the horizontal members in face-to-face contact with one another and with at least four bolts in vertical and horizontal load bearing relationship supporting the horizontal members on the vertical member.

3,969,868

INSULATION STRUCTURE

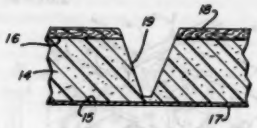
Huston K. Bainter, and Marvin E. Nerem, both of Forest City, Iowa, assignors to Winnebago Industries, Inc., Forest City, Iowa

Division of Ser. No. 173,234, Aug. 19, 1971, Pat. No. 3,909,995, which is a continuation of Ser. No. 15,602, March 2, 1970, abandoned, which is a continuation-in-part of Ser. No. 777,934, Sept. 9, 1968, abandoned, which is a continuation of Ser. No. 536,058, March 21, 1966, abandoned. This application Oct. 10, 1974, Ser. No. 513,531

Int. Cl.² E04C *2/22, 2/24*

U.S. Cl. 52—622 **10 Claims**

1. An insulation board structure comprising: a cellular plastic foam member having a first side and a second side, a continuous deformable first sheet member covering and secured to the first side of the foam member, adhesive means attaching the entire first side to the first sheet member, said foam member having a series of truncated, V-shaped grooves formed substantially through the thickness of the foam member, said grooves extending from the second side toward the first side, the apexes of said grooves being spaced from the first sheet member, said foam member being continuous adjacent the first sheet member, second sheet members covering the second side of the foam member between said grooves,



adhesive means attaching the second side to the second sheet members, and rigid members located between said first and second sheet members adjacent opposite transverse edges of the sheet members, said rigid members having end surfaces used when the insulation board structure is installed.

3,969,869

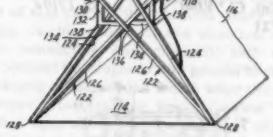
BUILDING TRUSS

Arthur F. Partridge, 1775 Delaware Ave., St. Paul, Minn. 55118

Filed Sept. 20, 1974, Ser. No. 507,952

Int. Cl.² E04C *3/02;* **E04B** *1/32*

U.S. Cl. 52—639 **15 Claims**



1. A scissors truss comprising a framework of rigid structural members forming a pair of distinct, mated complementary truss components, each of said components comprising distinct longitudinally extending continuous members forming corresponding upper and lower chords, said chords being in angled relation whereby said lower chord intersects and connected with said corresponding upper chord, a transverse member adjacent an end of at least one of said chords and connecting said upper and lower chords to form a triangle, said complementary truss components juxtaposed and mated to form a scissors truss and including fastening means mating said truss components and resisting relative angular movement of said truss components and wherein at least one upper chord crosses and extends beyond the complementary upper chord.

3,969,870

BAFFLE ASSEMBLY AND ILLUMINATOR GRID

Charles U. Deaton, Genesee Mountain, Golden, Colo. 80401

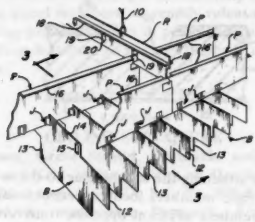
Filed Mar. 17, 1975, Ser. No. 558,641

Int. Cl.² E04H *12/18*

U.S. Cl. 52—645 **12 Claims**

1. A baffle assembly for an illuminator grid adapted to be supported below a source of light, comprising:
a normally parallel pair of primary baffle plates;
a series of secondary baffles normally in a generally perpendicular relation to said primary baffle plates;
said secondary baffles extending between said baffle plates, at least a substantial portion of each secondary baffle

being below said plates, at least a portion of said secondary baffles extending laterally beneath and beyond the corresponding baffle plate at one side and at least a portion of said secondary baffles extending laterally beneath and beyond the opposite baffle plate; and



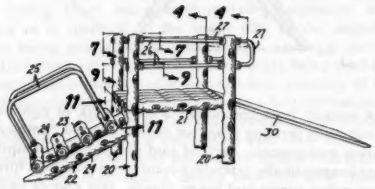
pivotal connections between said secondary baffles and said pair of baffle plates, whereby said baffle plates may be moved toward each other and said secondary baffles will pivot into an overlapping relation with the respective baffle plates at opposite sides thereof.

3,969,871

FASTENING CONSTRUCTION FOR PLAYGROUND EQUIPMENT

Ronald L. Ewers, Litchfield, Mich., assignor to The Toro Company, Minneapolis, Minn.

Filed Feb. 10, 1975, Ser. No. 548,563
Int. Cl.² E04C *3/30*; A63B *17/04*
U.S. Cl. 52—721 6 Claims



1. A basic unit of construction for use in playground equipment of the type constructed from interfitting tubular members and wooden timbers, comprising:

a wooden timber having a cross bore extending therethrough, said timber having a pair of recesses therein at opposite ends of said cross bore, said recesses each having a bottom comprising a substantially flat surface, said surfaces being parallel to one another;

a threaded tension member, said member having a diameter substantially less than the diameter of said cross bore and extending freely through said bore;

a pair of fittings, one each engaging said tension member at opposite ends thereof, at least one of said fittings being threadedly adjustable along said tension member, with said fittings each contacting an associated one of said flat surfaces so that said timber is placed in compression in the vicinity of said cross bore by threaded rotation of said fitting; at least one of said fittings having a recess therein for receipt of a tubular member;

a tubular member received within said fitting recess; and

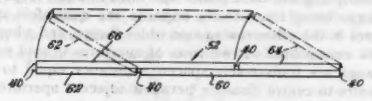
means carried by said recessed fitting for securing one end of said tubular member to said fitting within said recess.

3,969,872

METHOD OF CONSTRUCTING MODULAR BUILDINGS

Harry M. Wesse, c/o Harry M. Weese and Associates, 10 W. Hubbard St., Chicago, Ill. 60610

Division of Ser. No. 181,693, Sept. 20, 1971, Pat. No. 3,744,196. This application Oct. 30, 1972, Ser. No. 302,110
Int. Cl.² E04B *1/348*
U.S. Cl. 52—745 3 Claims



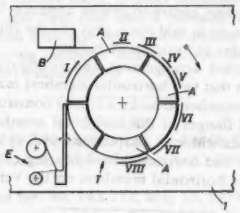
1. Method of constructing a building module of four connected lateral walls comprising casting two separate oblong layers of concrete superposed on each other with a series of reinforcing rods extending lengthwise of and embedded in each layer, attaching unfolded hinges between the two layers at their ends, embedding folded intermediate hinge means in each layer, allowing said layers to set, and thereby attaching the hinge leaves to the adjacent edges of the respective layers, then cutting the reinforcing rods at said intermediate hinge means, and then separating and moving the two layers into a four-sided hollow module by bending said hinge means.

3,969,873

MACHINE FOR MAKING BAG-LIKE TWO-COMPARTMENT PACKAGES PARTICULARLY TEA BAGS

Paul Gerhard Klar, Haus Seeblick, D-8992 Wasserburg, Germany

Filed Feb. 3, 1975, Ser. No. 546,697
Claims priority, application Germany, Feb. 7, 1974, 2405761
Int. Cl.² B65B *11/28*, *29/04*
U.S. Cl. 53—134 12 Claims



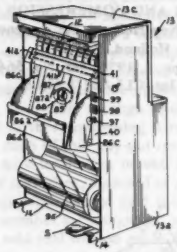
1. In a machine for making bag-like compartment packages of a pliant material, particularly tea bags having a tag secured thereto by a thread, which are formed solely by folding operations and closed by staples, from bag strips, filled with dosed portions of the substance to be packaged, fed continuously into the machine, and of the type including conveyance means circulating along a closed conveyance path and having mounted thereon manufacturing units which are controlled by means located outside the conveyance path, with each unit including folding members for forming the bag bottom, two raising arms for erecting the bag halves and a member on one raising arm for receiving a tag, and also including a device for cutting the bag strip: the improvement comprising, in combination, said conveyance means being continuously movable without interruption along said conveyance path; a respective common supporting frame for each unit mounted on said conveyance means for movement therewith; means mounting on each common supporting frame, for conjoint movement therewith along the conveyance path, all the devices for fold-

ing, closing and separating a bag from the strip, including respective said raising arms, one of which has a pocket for receiving a tag, a respective fold plate movable transversely to the bag strip and associated, for forming the bag bottom, with respective clamping holders movable oppositely thereto, a respective device for cutting a tag thread, respective folders for forming the V-shaped top closure of the bag, a respective device for further folding and finishing the top closure and a respective device for fastening the thread to the bag top; and means mounted stationarily outside the conveyance path for movement of said common supporting frames successively thereby, and controlling the operation of all of the devices mounted on each common supporting frame.

3,969,874
PACKAGING MACHINE

Walter C. Halcomb, 600 Galaxie; Naomi A. Eastman; Robert D. Eastman, both of 1004 Green; Harvey A. VanMeter, 809 E. Pearl, all of Harrisonville, Mo. 64701, and Russell W. Chapman, Rte. 1, Lee's Summit, Mo. 64063

Filed Oct. 17, 1974, Ser. No. 515,621
Int. Cl.² B65B 9/08
U.S. Cl. 53—183 **9 Claims**



1. Apparatus for packaging objects in bags successively formed from a supply of flexible tubular packaging material having opposing interconnecting panels, said apparatus comprising:

an upright frame;

guide means associated with said frame for receiving and supporting said packaging material;

a first sealing member supported on said frame to intermittently engage said packaging material and to effect a first seal between said opposing panels whereby said first seal forms a sealed bottom for a bag;

a cutting member supported on said frame to effect a cut substantially through one panel of said packaging material to form an open top portion of the bag at a location longitudinally offset along said packaging material from said first seal whereby objects can be received in said bag through the open top portion;

support means positioned to underlie the bag to support same thereon in a stationary position with the open top portion of the bag disposed to receive objects;

a second sealing member supported on said frame to effect a second seal between the opposing panels closely adjacent the top portion of the bag while the bag is maintained in its stationary position on said support means, whereby said bag can be sealed after receiving objects therein;

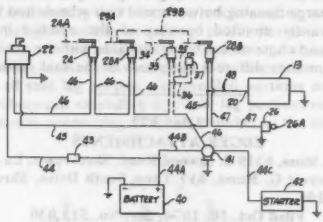
severing means supported on said frame to sever both panels of said packaging material above said second seal to separate the bag from the supply of packaging material while the bag is maintained in its stationary position on said support means; and

drive means to actuate said first and second sealing members, said cutting member, and said severing means.

3,969,875
SAFETY GROUNDING CIRCUITS

Thomas J. Nofel, Brookpark, Ohio, assignor to MTD Products Inc., Cleveland, Ohio

Filed Apr. 18, 1975, Ser. No. 569,561
Int. Cl.² A01D 75/20
U.S. Cl. 56—10.2 **9 Claims**

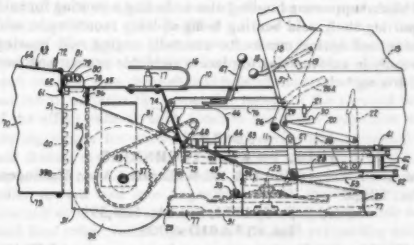


1. In an electrical system for controlling a function of a grass mower driven by an internal combustion engine having a magneto which if grounded stops the operation of the engine, said mower having a grass cutting unit powered by said engine, a clutch for engaging and disengaging the cutting unit with the engine, and a catcher carried by the mower for catching cut grass discharged therefrom when the catcher is in proper grass catching position on the mower, the combination of an electrical switch normally closed when the said clutch is engaged and disposed to be automatically opened upon the disengagement of said clutch, a second electrical switch normally closed when the said catcher is not in its proper grass catching position on the mower and disposed to be automatically opened upon the movement of said catcher to a location where it is at its said proper grass catching position, and electrical circuit means electrically connecting said magneto, said switches and ground to connect the magneto with ground to stop the engine upon the closing of said second switch when the catcher is not in said proper grass catching position unless the said first switch is then open upon the disengagement of said clutch to disconnect the magneto with ground.

3,969,876
COMBINATION MOWER AND CATCHER

William E. Turos, Parma, Ohio, assignor to MTD Products Inc., Cleveland, Ohio

Filed Apr. 18, 1975, Ser. No. 569,465
Int. Cl.² A01D 35/22
U.S. Cl. 56—202 **20 Claims**



1. The combination of an engine driven rotary mower having a pair of laterally spaced rear wheels and having a cutting unit including a rotary blade and housing for the blade, said cutting unit being movable to different elevations relative to said mower, the housing having a discharge opening through which cut grass and a current of air blown by the blade is discharged, a grass catcher having a forwardly directed open-

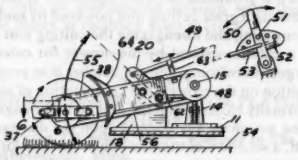
ing and carried by the mower at the rear thereof for receiving cut grass blown with air into said forwardly directed opening thereof, said catcher having screened egress means for the escape of the current of blown air therefrom while retaining cut grass in the catcher, chute means carried by the mower extended between said rear wheels and providing communication between said discharge opening of the said blade housing and to said catcher for directing cut grass and blown air from said discharge opening between said rear wheels and through said forwardly directed opening of the catcher into said catcher, said chute means being movable with the cutting unit to accommodate different elevations of the said cutting unit.

3,969,877

EDGER ATTACHMENTS

Robert J. Moss, 6319 S. Inwood Road, Shreveport, La. 71109, and Forrest G. Hurst, 417 Town South Drive, Shreveport, La. 71105

Filed Oct. 10, 1974, Ser. No. 513,830
Int. Cl.² A01D *53/14*
U.S. Cl. 56—256 **4 Claims**



1. An edger attachment for a lawn mower comprising an edger receiving assembly adapted for attachment to the deck of a lawn mower and a blade cutting assembly adapted for attachment to said receiving assembly, said receiving assembly including a pulley arranged in drivable relationship with the driving means of said mower, a tubular socket member on said receiving assembly, an arm rotatably mounted on said socket member, a blade supporting housing on said cutting assembly having a mounting shaft adapted for insertion into said socket member and means for locking the same thereto against axial movement along said shaft, a control rod rotatably affixed to said arm and remotely connected to the handlebar of said mower for moving said arm through arcuate movements in a vertical plane, said blade supporting housing including a blade supporting shaft having a rotatable pulley adapted for connection with a pulley on said receiving assembly by a driving belt, said blade supporting housing also including a bearing for said supporting shaft, said bearing being slidably mounting in said housing and spring means for normally urging said bearing forwardly in said housing to place a yieldable pressure against said driving belt.

3,969,878

FRUIT PICKING TECHNIQUE

Herman C. Morganeier, 110 W. Williamson Ave., Harlingen, Tex. 78550

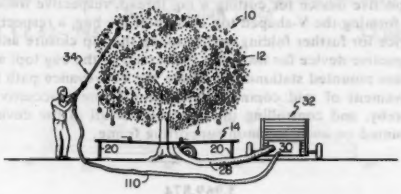
Filed Sept. 5, 1974, Ser. No. 503,391
Int. Cl.² A01D *46/00*
U.S. Cl. 56—328 R **5 Claims**

1. A device for picking a stem supported fruit of a generally uniform predetermined mixture size transverse to the stem axis, the device comprising:

an elongate frame having a fruit receiving end including an open ended cup smaller in size than the predetermined maximum size;

a vacuum pneumatic motor for rotating the cup for severing the fruit from its source;

means for selectively applying a vacuum to the cup for grasping fruit therein prior to applying a vacuum to the motor; and



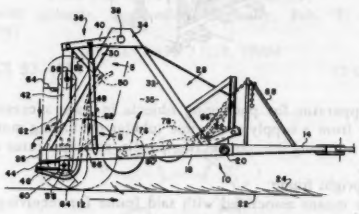
means for releasing the vacuum and allowing the fruit to fall by gravity from the cup.

3,969,879

HAY ROLLING MACHINE WITH IMPROVED ROLL STARTING AND COMPRESSION MEANS

Shaun A. Seymour, New Holland, Pa., assignor to Sperry Rand Corporation, New Holland, Pa.

Filed Apr. 1, 1975, Ser. No. 564,177
Int. Cl.² A01D *39/00*
U.S. Cl. 56—341 **15 Claims**



1. In a machine of the type adapted to form a swath or windrow of hay or other suitable crop material lying upon a field into a roll thereof by rolling the same along the field until a roll of predetermined size is formed and including a mobile frame being open at the bottom thereof and adapted to be moved along the field, supplemental frame means carried by said mobile frame at a rearward end thereof and endless flexible means movably mounted by said supplemental frame means and having hay engaging means which, upon movement of said flexible means, elevate said windrow of hay and engage said roll thereof as formed to rotate said roll of hay forwardly within said mobile frame; the improvement comprising a lower transverse series of hay-directing fingers supported by said supplemental frame means in spaced relation above the field and extending forwardly therefrom for engagement with hay being elevated by said hay engaging means and operable to strip the hay therefrom and direct the same forwardly in a roll-forming direction at least during an initial period in the formation of a roll thereof, said fingers being adapted to yield and move upwardly from their initial forwardly extending positions as the diameter of said roll increases as formed within said mobile frame.

3,969,880

MACHINE FOR MANUFACTURING CABLES BY STRANDING INDIVIDUAL WIRES

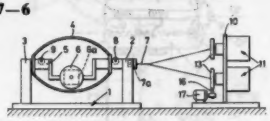
Charles Maillefer, Renens, and René Schlaeppi, Prilly, both of Switzerland, assignors to Maillefer S.A., Switzerland

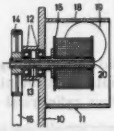
Filed Feb. 18, 1975, Ser. No. 550,739

Claims priority, application Switzerland, Mar. 1, 1974, 2961/74; Nov. 18, 1974, 15327/74

Int. Cl.² D01H 7/02

U.S. Cl. 57—6 14 Claims





1. A machine for manufacturing cables by stranding individual wires, comprising: a pay-out apparatus having four pay-out reels and fixed supports therefor; a stranding apparatus situated after said pay-out apparatus and comprising a forming die receiving said individual wires; a take-up apparatus having a take-up reel, a support for said take-up reel, and cable-pulling means for pulling said cable through said die at a predetermined speed; and further comprising wire-tensioning means disposed between each of said pay-out reel supports and said die, each of said wire-tensioning means comprising a guide member for one of said wires, disposed at a fixed location and coaxial with a respective one of said reels, a zone situated before said guide member for nonguided passage of a portion of said wire from said reel to said guide member, means for driving each said pay-out reel at a variable speed of rotation, said speed being sufficient to cause said portion of wire to assume the form of a loop under the effect of centrifugal force, thus tensioning said wire through said centrifugal force, and means independent of said cable-pulling means for controlling said variable speed of rotation, said speed of rotation being constantly the same for all said pay-out reels.

3,969,881

MACHINES FOR THE PRODUCTION OF CHENILLE YARNS AND SPOOLING THEREOF

Luigi Boldrini, Via dell'Olivuzzo 54, Florence, Italy

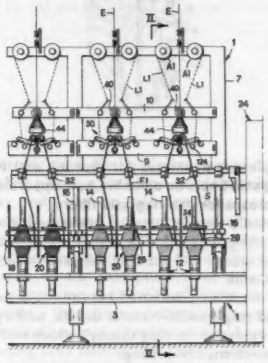
Filed June 17, 1975, Ser. No. 587,653

Claims priority, application Italy, Dec. 23, 1974, 9656/74

Int. Cl.² D02G 3/42

U.S. Cl. 57—24 10 Claims

1. A machine for the production of pairs of chenille yarns, each formed by two binding yarns twisted together to bind therebetween short sheared lengths of an effect yarn, said machine comprising, in combination, an upright frame; respective forming units, for each pair of chenille yarns, mounted on said frame; a plurality of pairs of spindles mounted on said frame for rotation about substantially vertical axes, each pair of spindles receiving the chenille yarns from a respective forming unit; a horizontal bench mounted on said frame for vertical displacement relative to said spindles, and carrying annular tracks each coaxial with a respective spindle; respective annular sliders angularly displaceable on each track and entrainable by the yarn to be wound on the associated spindle; two pairs of binding yarn supplies, mounted on said frame, for forming each pair of chenille yarns; each forming unit including a respective control shaft rotatably mounted on said frame; motor means operable to rotate said control shafts; driving means interconnecting each control shaft and the associated pair of spindles to rotate the latter; a respective rotary bell member, for each forming unit, rotatably mounted on said frame, each bell member having an axial passage therethrough for a respective effect yarn and two guide bushes spaced radially from said axial passage and through which the respective effect yarn, threaded through said axial passage, is successively threaded in opposite radial directions; a respective winding and sizing member, for forming the sheared lengths of effect yarn, mounted on said frame beneath each rotary bell member; each winding and sizing member being formed by two spaced profile portions converging upwardly toward a leg portion and defining two outwardly facing concave surfaces merging with respective opposite surfaces of said leg portion, the profiled portions defining a slot therebetween extending into said leg portion; respective driving means connecting each bell member to the associated



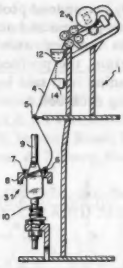
control shaft for rotation thereby; each effect yarn, by rotation of the associated bell member, being wound on the associated winding and sizing member to form turns around the leg portion thereof; a respective shearing blade disposed symmetrically in the slot between each pair of profiled portions and projecting into the associated leg portion to shear the turns of effect yarn wound on the latter to form, from each turn, two sheared lengths of effect yarn; a respective pair of feed rollers, for each forming unit, each engaged with a respective said concave surface to entrain a respective half of the sheared turns of effect yarns; means operable to feed, between each feed roller and the adjacent concave surface, a first one of the two binding yarns of each chenille yarn to overlie the respective halves of the sheared turns of effect yarn on such adjacent concave surface; each profiled portion having a hole therethrough opening into its concave surface; positive feed means operable to feed the second one of the two binding yarns of each chenille yarn through said hole of the respective profiled portion to underlie the respective halves of the sheared turns of the effect yarn on such concave surface; a respective supporting means for each feed roller oscillatably mounted on said frame; resilient means operatively associated with each supporting means and operable to bias the associated feed roller toward and into engagement with the adjacent said concave surface; a respective auxiliary roller, cooperable with each feed roller, rotatably mounted on each supporting means adjacent the lower end of the associated said concave surface; and means biasing each auxiliary roller toward the associated feed roller to exert a traction on the respective binding yarns; each feed roller and its associated auxiliary roller feeding the two respective binding yarns, between which the sheared lengths of effect yarn are engaged, over a free span to the associated annular slider for twisting of the two binding yarns about each other by cooperation of the associated spindle and annular slider.

3,969,882

PROCESS AND APPARATUS FOR FIBER WETTING IN SPINNING DEVICE OF THE RING-SPINDLE-TRAVELER TYPE

Manuel Cilloniz Oberti, P.O. Box 544, Lima, Peru

Filed Sept. 30, 1974, Ser. No. 510,868
Int. Cl.[2] D01H *13/30*
U.S. Cl. 57—35 5 Claims



1. In a spinning apparatus for drawing and twisting fibers and winding said fibers on a bobbin, said apparatus including:

drafting means for drawing said fibers;

a ring-spindle-traveler device positioned downstream of said drafting means for twisting the fibers drawn by said drafting means and winding the thus twisted fibers on a bobbin; and

an eyelet member positioned between said drafting means and said ring-spindle-traveler device, said eyelet member having an eyelet opening through which said fibers pass;

the improvement comprising:

a trough positioned in the path of travel of said fibers between said drafting means and said eyelet member, said trough having therein a fiber wetting liquid, said trough and liquid being spaced from and completely out of contact with said drafting means, said trough having in the bottom thereof opening means for allowing passage therethrough of said fibers, said opening means being of a size greater than the diameter of said fibers, said fibers passing from said drafting means and through said liquid, such that said fibers are wetted after they are drawn by said drafting means and before they pass through said eyelet opening and are twisted by said ring-spindle-traveler device, the path of travel of said fibers from said drafting means, through said liquid, and to said eyelet member being inclined to the vertical.

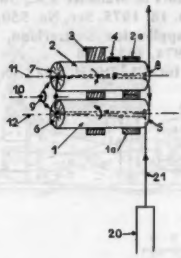
3,969,883

SPINDLE FOR FALSE TWIST BY FRICTION

Jacques Neveux, Riorges, France, assignor to Chavanoz S.A., Chavanoz, France

Filed Oct. 10, 1974, Ser. No. 513,624
Claims priority, application France, Oct. 19, 1973, 73.37987
Int. Cl.[2] D02G *1/04, 1/06;* D01H *7/92*
U.S. Cl. 57—77.4 6 Claims

1. In a device for false twisting a moving textile yarn by friction including two hollow cylindrical elements positioned in generally side-by-side relation with their axis substantially parallel and mounted for rotation in opposite directions, said elements being equipped at all their ends with friction elements for engaging a yarn strand passing therethrough to impart twist to the yarn during rotation of the elements, the improvement comprising at least one thread guidance and return means positioned adjacent one end of the hollow rotary cylindrical elements for directing the yarn strand at least twice into engagement with each of said friction elements to impart twist thereto, and said means is offset with respect to a plane containing the longitudinal axes of the hollow cylindrical elements whereby the plane in which the thread is contained



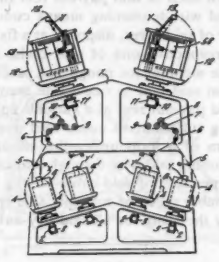
at the time of its passage about said thread engaging surface of the guidance and return means intersects the plane formed by the longitudinal axes of the hollow cylindrical elements.

3,969,884

TWISTER

Shu Inohara, Sakai, and Yasuyuki Nagamune, Osaka, both of Japan, assignors to Kabushiki Kaisha Kajitekkosho, Japan

Filed Nov. 8, 1974, Ser. No. 522,126
Int. Cl.[2] D01H *1/10, 7/86*
U.S. Cl. 57—58.54 2 Claims



1. An apparatus for the manufacture of twisted yarns and cordage which comprises a plurality of double twisters disposed in juxtaposition with respect to each other and a single cable double twister disposed above said plurality of twisters and containing a power-driven bobbin rotatably disposed therein, means associated with said bobbin for controlling the torque in said bobbin so as to ensure a constant stretch of the yarns and a plurality of feed rollers and tension adjuster rollers disposed between said double twisters and said single cable double twister for conveying the yarn from said plurality of twisters to said single-cable double twister.

3,969,885

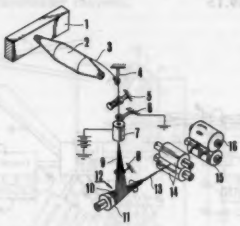
METHOD FOR MANUFACTURING A TEXTURED YARN

Meiji Anahara, Kyoto; Yukio Kawasaki, Takatsuki, and Yasuo Suzuki, Gifu, all of Japan, assignors to Toyo Boseki KK, Osaka, Japan

Filed Nov. 27, 1974, Ser. No. 527,768
Claims priority, application Japan, Dec. 6, 1973, 48-139136
Int. Cl.[2] D02G *3/00, 3/36*
U.S. Cl. 57—157 R 24 Claims

1. A method for manufacturing a textured yarn, comprising the steps of: passing at least one continuous multi-filament yarn of artificial fiber to a rotating spindle from a fixed point while simultaneously spreading said multi-filament yarn into

individual filaments; wrapping at least part of said filaments around said spindle in the form of a sleeve; continuously



withdrawing said sleeve along the spindle axis at a speed lower than the feed speed of said multi-filament yarn; and collecting the yarn thus obtained in an orderly manner.

3,969,886

DIGITAL ELECTRONIC WATCH FOR DISPLAYING BOTH TIME AND THE TIME REMAINING WITHIN A PRESELECTED TIME PERIOD

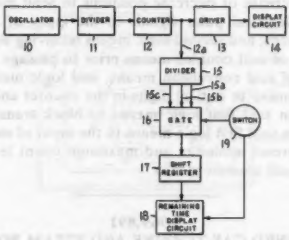
Kazuhiro Yoda, Komae, Japan, assignor to Kabushiki Kaisha Daini Seikosha, Japan

Continuation of Ser. No. 276,651, July 31, 1972, abandoned. This application Oct. 21, 1974, Ser. No. 516,731

Claims priority, application Japan, June 30, 1971, 46-57300

Int. Cl.² G04C *3/00*

U.S. Cl. 58—23 R **13 Claims**



1. In a digital electronic watch: means for generating an electric timing pulse signal having a sufficient pulse repetition rate to be used as a time reference; solid-state time display means receptive of and responsive to said electric timing pulse signal for displaying the time in minutes and hours in digital form; solid-state remaining-time display means receptive of and responsive to said electric timing pulse signal and operative when turned ON for displaying information representative of the time remaining within at least one preselected time period in discrete digital form; and a single manually-actuated switching means coacting with said solid-state remaining-time display means for manually switching ON said remaining-time display means to initiate the running of said time period.

3,969,887

ELECTRONICALLY CONTROLLED TIMEPIECES USING LIQUID CRYSTAL DISPLAY ELEMENTS

Shigeru Fukumoto, Kobe, Japan, assignor to Kabushiki Kaisha Suncrux Research Office, Kobe, Japan

Filed Mar. 6, 1974, Ser. No. 448,692

Claims priority, application Japan, Mar. 8, 1973, 48-27260; Mar. 24, 1973, 48-33698

Int. Cl.² G04B *19/30, 19/06*

U.S. Cl. 58—50 R **27 Claims**

1. An electronic time display device comprising a case, a source of electric power, a time base, an electronic circuit and a time display body wherein said time base generates time output pulses with a prime frequency, said electronic circuit including means for producing a plurality of pulses suitable for driving display sections and means for producing a plurality of control pulses to control said plurality of pulses, said time display body comprising a plurality of liquid crystal display sections to create a time display pattern representing an analogical time indication, said plurality of liquid crystal display sections including hour information display sections and minute information display sections, said hour and minute information display sections including segment electrodes and common electrodes, and said segment electrodes and common electrodes in blocks, said blocks including boundaries defined by said common electrodes, said hour information segment electrodes positioned symmetrically within the boundaries of said blocks; each said block including a plurality of segment electrodes; a plurality of said segment electrodes electrically connected in series with a selected segment electrode in an adjacent block, said minute information segment electrodes positioned symmetrically within the boundaries of said blocks; each said block including a plurality of segment electrodes; a plurality of said segment electrodes electrically connected in series with a selected segment electrode in an adjacent block.

3,969,888

DRIVING MECHANISM FOR DAY-DATE CALENDAR DEVICE

Cyril Veuilleumier, Chemin de Beaumont 64, 2500 Bienne; André Triponez, Lyss-Str. 75, 2560 Nidau; Jean-Pierre Schindler, Chemin des Alouettes 10, 2710 Tavannes, and Michel Schwab, Allee de la Champagne 42, 2502 Bienne, all of Switzerland

Filed Dec. 10, 1973, Ser. No. 423,186

Claims priority, application Switzerland, Dec. 11, 1972, 18006/72; Jan. 18, 1973, 669/73

Int. Cl.² G04B *19/24*

U.S. Cl. 58—58 **10 Claims**

1. A mechanism for driving a day and date calendar indication means of a watch, comprising:

means (1, 2) for transmitting continuous rotary motion;

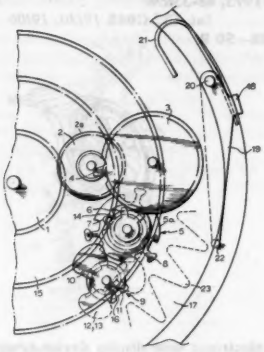
means (5) for converting said continuous rotary motion into intermittent rotary motion;

a rotatable day calendar (15);

means (5) for transmitting said intermittent rotary motion to index the rotatable day calendar (15);

a rotatable date calendar (17);

clutch means (12, 13) disposed between said rotatable date calendar (17) and said converting means for transmitting motion to index said date calendar when said day calendar is indexed; and



means for blocking transmission of motion from said date calendar to said day calendar so that said date calendar may be indexed independently of said day calendar.

3,969,889

METHOD OF MANUFACTURING STEPPED BUSHINGS FOR CHAINS

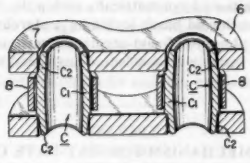
Kumakichi Araya, No. 2, Daishoji Seki, Kaga, Ishikawa, Japan

Filed Oct. 24, 1974, Ser. No. 517,609

Claims priority, application Japan, Oct. 31, 1973, 48-121683; Dec. 12, 1973, 48-137630

Int. Cl.² B21L 9/02

U.S. Cl. 59—8 3 Claims



1. A method of manufacturing a stepped bushing having two portions extending beyond a central portion of lesser diameter than the central portion comprising forming a cylindrical bushing blank body of a predetermined length, inserting a pin of substantially the diameter of the interior of the body into said body, applying pressure and form rolling by grooved rolls, said blank body to form a stepped bushing with the outside diameters in the extreme outer peripheral edges of the reduced diameter portions greater in diameter than the outside diameter at the juncture with the central portion, the interior diameter of the bushing at the outer peripheral edge being greater in diameter than the interior diameter of the bushing at the juncture with the central portion, the extreme outer edge of the bushing having an angle of enlargement with the interior of the bushing at the outer edge of from 1 to 2 degrees.

3,969,890

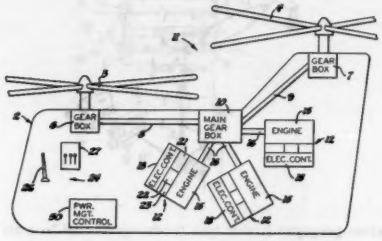
HELICOPTER POWER PLANT CONTROL

Robert E. Nelson, Indianapolis, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed July 17, 1974, Ser. No. 489,262

Int. Cl.² F02C 7/02

U.S. Cl. 60—39.15 5 Claims



1. A control system for a power plant including a plural number of combustion engines connected to drive a common load comprising, in combination, a fuel control for each engine operative to control fuel flow to the respective engine, first means settable by an operator effective to vary the power setting of said fuel controls, power trim means coupled to each fuel control effective to modify the power setting of the fuel control, digital up/down counter means having an input and an output, digital-to-analog conversion means having an input to receive the output of said digital counter means and means to convert the output of said digital counter means into an analog electrical signal for transmission to the power trim means, means effective to load the counter means to a predetermined set count when the fuel control is initially energized, beeper means effective to vary the power trim means of the engine over a preset range from a nominal rated speed, said beeper means including second means settable by an operator including a normally open switch having a speed increase and a speed decrease position, means including first logic means having gates operable in response to positioning of said switch in speed increase or decrease positions to send increase and decrease electrical pulse signals to the input of the preset counter means, and second logic means receiving signals from the output of said counter means prior to passage thereof to the input of said conversion means, said logic means having gates responsive to critical digits in the counter and effective to condition said first logic means to block transmission of signals from said first logic means to the input of said counter means at preset minimum and maximum count levels at the output of said counter means.

3,969,891

COMBINED GAS TURBINE AND STEAM POWDER PLANT

Emile Aguet, Winterthur, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed July 25, 1974, Ser. No. 491,631

Claims priority, application Switzerland, Jan. 10, 1974, 269/74

Int. Cl.² F01K 23/06; F02C 7/02

U.S. Cl. 60—39.18 B 5 Claims

1. A combined gas turbine and steam power plant comprising

a pressure vessel;

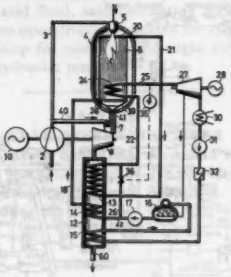
an air compressor connected with said pressure vessel to deliver compressed air to said pressure vessel;

an evaporator within said pressure vessel for receiving and evaporating a flow of working medium;

a gas turbine connected to an outlet of said pressure vessel to receive a flow of combustion gases therefrom;

a housing connected to an outlet of said gas turbine to receive a flow of exhaust gases therefrom;

at least one feedwater preheating surface in said housing for conducting a flow of feedwater in heat exchange relation with said flow of exhaust gases, said preheating surface being connected to said evaporator to deliver the preheated feedwater thereto;



a first superheating surface disposed in the flow of exhaust gases from said gas turbine outside said pressure vessel and connected to said evaporator to receive the working medium; and

a second superheating surface inside said pressure vessel connected to said first superheating surface to receive the working medium therefrom.

3,969,892

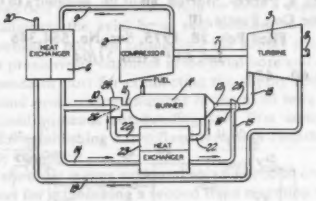
COMBUSTION SYSTEM

Richard J. Stettler, and Albert T. Verdouw, both of Indianapolis, Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed Nov. 26, 1971, Ser. No. 202,191

Int. Cl.² F02C 7/10

U.S. Cl. 60—39.51 R **13 Claims**



1. A gas turbine engine comprising, in combination, rotary air compressor means adapted to deliver substantially unadulterated compressed air, combustion apparatus supplied with the said air by the compressor means, and turbine means supplied with motive fluid by the combustion apparatus and connected to drive the compressor means, characterized by combustion apparatus adapted to deliver hot combustion products relatively free of contaminants including means defining a combustion zone, means defining a dilution zone downstream of the combustion zone, means for directing some of the said air from the compressor as unadulterated combustion air to the combustion zone and some as unadulterated dilution air to the dilution zone, means for recirculating combustion products from the combustion zone to the combustion zone by-passing the dilution zone, and means for transferring heat from the recirculating combustion products to the said dilution air flowing to the dilution zone.

3,969,893

EXHAUST GAS EMISSION CONTROL DEVICE FOR MULTI-CYLINDER ENGINES

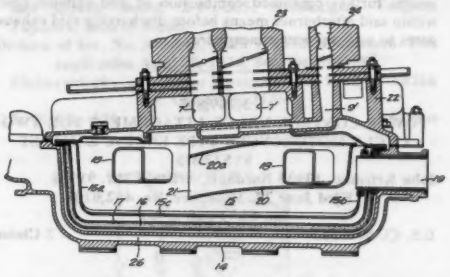
Yoshitoshi Sakurai, Kawaski, and Takao Okura, Saitama, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 3, 1974, Ser. No. 511,809

Claims priority, application Japan, Oct. 15, 1973, 48-114763

Int. Cl.² F01N 3/08, 3/10

U.S. Cl. 60—282 **6 Claims**



1. In an internal combustion piston engine having cylinders arranged in two banks in a V-shape, each cylinder having an exhaust passage, the combination of: walls forming an exhaust gas reaction chamber positioned between the two banks of cylinders, a plurality of exhaust tubes connected to receive hot exhaust gases from the cylinder exhaust passages and each having a discharge end projecting through said walls, a shroud positioned within the reaction chamber and extending for substantially less than the length of the reaction chamber, said shroud having a discharge opening directed toward an end wall of said reaction chamber, an exhaust pipe associated with an opposite end wall of said reaction chamber, said shroud having a closed end adjacent said exhaust pipe, certain of said exhaust tubes discharging into said shroud and certain of said exhaust tubes discharging into said reaction chamber.

3,969,894

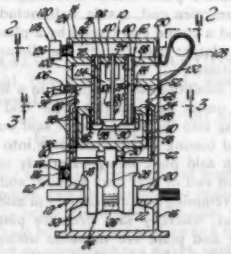
INTERNAL COMBUSTION ENGINE

William V. Bachmann, 22517 Ten Mile Road, St. Clair Shores, Mich. 48080

Continuation of Ser. No. 452,259, March 18, 1974, abandoned, which is a continuation-in-part of Ser. No. 365,161, May 30, 1973, Pat. No. 3,805,524, which is a continuation of Ser. No. 116,892, Feb. 19, 1971, abandoned. This application Sept. 3, 1974, Ser. No. 502,640

Int. Cl.² F02B 75/10, 75/18

U.S. Cl. 60—307 **36 Claims**



1. An internal combustion engine, comprising engine housing means, an annular cylinder formed in said housing means, said annular cylinder comprising a first radially inner annular wall and a second radially outer annular wall, combustion chamber means communicating with said annular cylinder,

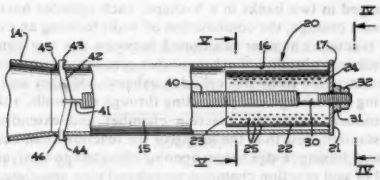
cup-like ring piston means received in said annular cylinder for reciprocating movement therein, motion transmitting means operatively connected to said ring piston means for transmitting the reciprocating movement of said ring piston means to associated power output means, afterburner means situated generally radially inwardly of said first inner annular wall and in communication with the ambient atmosphere, and exhaust passage means communicating between said combustion chamber means and said radially inwardly situated afterburner means, said afterburner means being effective to receive said exhaust gases from said exhaust passage means to enable further continued combustion of said exhaust gases within said afterburner means before discharging said exhaust gases to said ambient atmosphere.

3,969,895

POWER CONTROL VALVE ATTACHMENT FOR TWO CYCLE MOTORCYCLE TYPE ENGINE EXHAUST SYSTEMS

John Krizman, 13935 Nordhoff, Arleta, Calif. 91331

Filed June 24, 1974, Ser. No. 482,010
Int. Cl.² F02B 27/02
U.S. Cl. 60—312 **2 Claims**



1. A power control valve attachment for assembly to a pre-existing exhaust system of a two cycle type engine for increasing the power output characteristics thereof, said exhaust system having a back pressuring chamber including an outlet duct section of a given predetermined minimum internal cross sectional area of the exhaust system duct section for effecting a given back pressuring of the engine cylinder chambers during operation of the engine, said attachment comprising:

an assembly of pressure plate means for sensing the pressure of exhaust gases flowing out said duct section and biasing means for biasing said pressure plate means against deflective movement under pressure of said exhaust gases, said pressure plate means including a tubular member having an open end, a side wall including a plurality of ports and a closed end closed by a plate having an outer diameter larger than the internal diameter of said outlet duct section;

means for mounting said assembly in a slip fit relationship to said outlet duct section with said tubular member extending into the open end of said outlet duct section, with said biasing means extending into said duct section and with said plate being exteriorly and biased toward said open end of said duct section; and

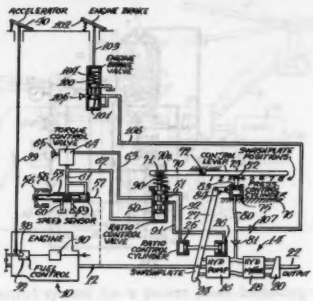
means for retaining said attachment in assembled relation to said duct, whereby said pressure plate means tubular member and plate are movable under the pressure of exhaust gases from a duct section closure position wherein said plate abuts and closes the open end of said duct section to variable back pressuring positions wherein portions of said tubular member protrude from said duct section open end and said plate is axially spaced therefrom.

3,969,896

TRANSMISSION RATIO CONTROL SYSTEM

Joseph E. Louis, Ames, Iowa, assignor to Sundstrand Corporation, Rockford, Ill.

Filed May 8, 1975, Ser. No. 575,450
Int. Cl.² F15B 15/18; F16H 39/46
U.S. Cl. 60—431 **15 Claims**



1. A drive, comprising,

a. an engine having fuel supply means for controlling engine torque,

b. a hydrostatic transmission driven by the engine including means for setting and varying the transmission ratio,

c. a ratio control valve for controlling the ratio setting and varying means,

d. means for applying a bias to the ratio control valve proportional to engine speed, and

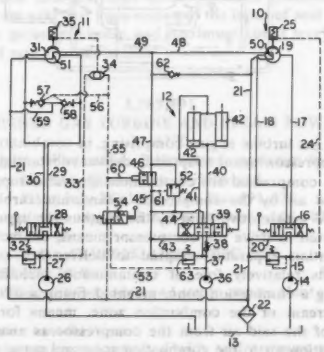
e. means responsive to the system pressure of said hydrostatic transmission for applying an opposing bias to the ratio control valve proportional to engine torque.

3,969,897

TEMPERATURE-CONTROL ARRANGEMENT FOR A PAIR OF HYDRAULIC MOTORS

Rex T. Humphreys, Washington; Glenn J. Medina, Joliet, and Patrick A. Parker, Morton, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Feb. 28, 1975, Ser. No. 554,346
Int. Cl.² F15B 21/04
U.S. Cl. 60—456 **6 Claims**



1. In a hydraulic system having a plurality of hydraulic motors operated by fluid from a common reservoir, and incorporated in a pipelayer having a movable boom, a winch suspended from said boom, an extensible counterweight for

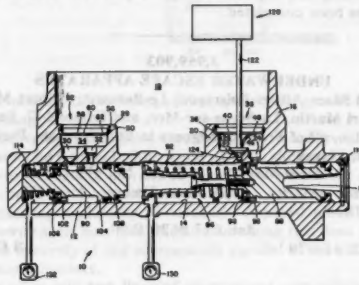
countering the load on said boom, a first circuit including a rotary hydraulic motor for operation of said boom, a second circuit including a rotary hydraulic motor for operation of said winch, and a third circuit including a motor for operation of said counterweights, and a separate pump for each of said circuits, the improvement comprising:

circulating means for circulating a flow of fluid from said reservoir through the housings of said motors to thereby maintain a substantially equal temperature between said motors and said fluid, said circulating means including conduit means operatively connected for circulating fluid from said pump for said counterweight circuit through said rotary hydraulic motors.

3,969,898
RESERVE RESERVOIR COVER

Keith H. Fulmer, South Bend, Ind.; Raymond Kosarski, Jr., and Harold W. Hughes, both of St. Joseph, Mich., assignors to The Bendix Corporation, South Bend, Ind.

Filed June 30, 1975, Ser. No. 591,749
Int. Cl.² B60T 17/22
U.S. Cl. 60—534 **7 Claims**



1. A master cylinder comprising:

a housing having an axial bore therein, said housing having a projection extending therefrom to form a supply reservoir adjacent the axial bore, said housing having a first compensator port for connecting the supply reservoir to a first pressurizing chamber in the axial bore and a second compensator port for connecting the supply reservoir to a second pressurizing chamber in the axial bore;

first shoulder means surrounding said first compensator port for establishing a first fixed retention chamber in the supply chamber;

second shoulder means surrounding said second compensator port for establishing a second fixed retention chamber in the supply chamber;

first cover means secured to said first shoulder means having a first flapper valve for preventing unrestricted fluid flow from the first retention chamber into the supply chamber;

second cover means secured to said second shoulder means having a second flapper valve for preventing unrestricted fluid flow from the second retention into the supply chamber;

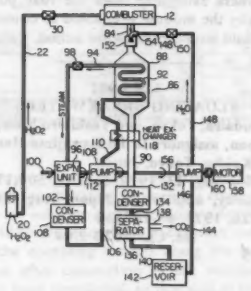
piston means located in said axial bore for establishing said first and second pressurizing chambers therein; and

actuation means responsive to an input force for sequentially moving said piston means in said axial bore past said first compensator port to produce a first pressurizing fluid in said first pressurizing chamber and past said second compensator port to produce a second pressurizing fluid in said second pressurizing chamber, a portion of the fluid in the second pressurizing chamber being transmitted through said second compensator port into said second retention chamber during the time period required to move the piston means past said first compensator port and said second compensator port, said second flapper valve means intercepting said portion of the fluid in the second retention chamber to prevent expulsion into said supply chamber.

3,969,899
FUEL BURNING APPARATUS AND HEAT ENGINE INCORPORATING THE SAME

Sadaharu Nakazawa, 30-8, Nagaham, Kanazawa, Yokohama, and Hisashi Izumi, 2-9-1-305, Nishikaigan, Tsuijido, Fujisawa, both of Japan

Division of Ser. No. 349,042, April 9, 1973, abandoned. This application Aug. 27, 1974, Ser. No. 501,088
Claims priority, application Japan, Apr. 18, 1972, 47-38266
Int. Cl.² F01K 21/04
U.S. Cl. 60—670 **14 Claims**



1. A steam engine comprising a combustion chamber, fuel feeding means for feeding a fuel into said combustion chamber, oxidizer feeding means for feeding into said combustion chamber hot oxidizing gases produced through exothermic decomposition of hydrogen peroxide for promoting burning of said fuel in said combustion chamber and consequently producing hot combusted gases, first water feeding means for injecting water into said combusted gases for producing working gases having a suitable end predetermined temperature and volume, an evaporator unit including an evaporation chamber communicating with said combustion chamber for receiving said working gases and at least one heat-exchange pipeline passing through said evaporation chamber, second water feeding means for feeding water into said heat-exchange pipeline for producing steam in said pipeline as water is passed through said pipeline, and a steam expansion unit having an inlet end leading from an outlet end of said pipeline for allowing said steam to expand and produce a driving force.

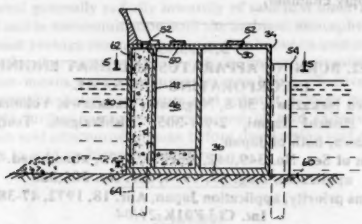
3,969,900
BREAKWATER CONSTRUCTION

Tomasz Plodowski, Upper Montclair, N.J., assignor to Raymond International, Inc., Houston, Tex.

Filed Aug. 29, 1974, Ser. No. 501,829
Int. Cl.² E02B 3/06
U.S. Cl. 61—4 **15 Claims**

1. A breakwater structure comprising at least one module having an upstanding wall-like surface for resisting wave action, said module being positioned such that said wall-like surface extends from below the sea surface to a location above the sea surface for encountering sea waves, said module having front and rear portions displaced from each other in a direction transverse to the plane of said wall-like surface, and a plurality of pile members connected to and extending downwardly from said front and rear portions into engagement with the sea bed therebelow to a depth sufficient to attain resis-

tance to lateral movement of said module and to resist vertical loading forces from said module, said rear portion of said module having greater buoyancy than said front portion and the pile members extending from the front portion of said



module being subjected to a greater compressive stress than the pile members extending from the rear portion of said module whereby the module is enabled to counter the forces produced on said structure by wave action.

3,969,901

FLOATING BREAKWATERS

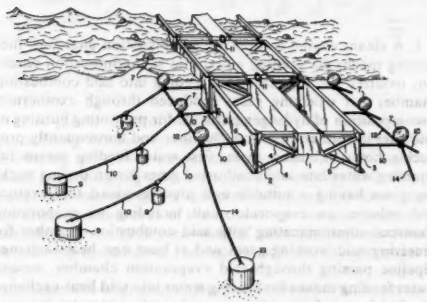
Tadashi Matsudaira, Tokyo, and Yoshihiro Mishina, Matsudo, both of Japan, assignors to Ishikawajima-Harima Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 23, 1974, Ser. No. 500,178

Claims priority, application Japan, Aug. 28, 1973, 48-95769; Sept. 26, 1973, 48-107534

Int. Cl.² E02B 3/04

U.S. Cl. 61—5 8 Claims



1. A floating breakwater comprising a plurality of floating breakwater units interconnected in side by side relation with each other, each of said floating breakwater units including a float, a front and rear barrier joined to the front and rear sides of said float in forwardly and backwardly spaced apart relation therewith, respectively, and anchor cables for mooring said floating breakwater unit to anchor blocks.

3,969,902

CONTRUCTION METHOD FOR CONTINUOUS ROW OF PILES AND EARTH DRILL FOR USE THEREFOR

Yoshio Ichise, and Akio Yamakado, both of Tokyo, Japan, assignors to Yoshino Ichise, Tokyo, Japan

Filed July 22, 1974, Ser. No. 490,246

Claims priority, application Japan, July 23, 1973, 48-83450; June 29, 1974, 49-76663[U]

Int. Cl.² E02D 29/00, 5/20

U.S. Cl. 61—35 12 Claims

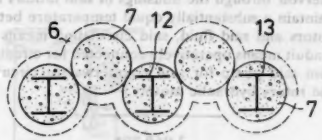
1. A method for forming a continuous row of piles comprising the steps of:

boring a first hole in the ground;

hardening the ground surrounding said first hole by forcing a ground hardening liquid under high pressure into said ground surrounding said first hole;

filling said first hole with mortar;

boring a second hole adjacent said first hole;



hardening the ground surrounding said second hole by forcing a ground hardening liquid under high pressure into said ground surrounding said second hole, a portion of the ground surrounding said first and second holes being common to both said holes;

filling said second hole with mortar, and

repeating said steps of forming said piles until a row of piles has been completed.

3,969,903

UNDERWATER ESCAPE APPARATUS

Gérald Marc Albert Boisrayon, Le-Beausset; Gilbert Marius Henri Martin, La Seyne-sur-Mer, and Edmond G. Fagnen, Toulon, all of France, assignors to Etat Francais, Paris Armies, France

Filed May 20, 1975, Ser. No. 579,215

Claims priority, application France, Aug. 22, 1974, 74.28787

Int. Cl.² B63C 9/00

U.S. Cl. 61—70 8 Claims

1. Underwater escape apparatus intended for use in conjunction with an underwater escape suit provided with means for imparting to the suit an ascent velocity to permit escape from an underwater location to the water surface, said apparatus comprising a container adapted to be fixed to the suit, ascent retarder means normally inside said container but movable from said container to retard the ascent of a suit to which the container is fixed, pressure responsive means carried by said container for, when pressurized, moving said ascent retarder means from said container, a pressure gas cylinder adapted to be carried by the suit and connected to said container by flexible conduit for pressurizing said pressure responsive means so as to effect movement of said ascent retarder means from said container, obturating means normally closing off fluid communication through said conduit between said container and said gas cylinder, and water depth responsive trigger means adapted to be carried by the suit for automatically triggering opening of said obturating means as

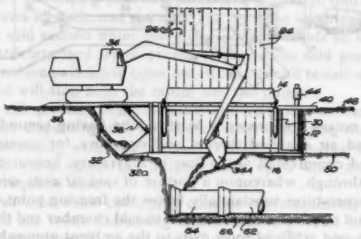
soon as immersion depth becomes smaller than a predetermined threshold depth, whereby to effect operation of said ascent retarder means and hence reduction of ascent velocity during ascent from said threshold depth.

3,969,904

METHOD OF LAYING A PIPELINE IN A TRENCH

Anthony Ronald Seaton Morrice, Harrogate, England, assignor to Hudswell Morrice Ltd., Leeds, England

Filed Feb. 11, 1974, Ser. No. 441,713
Int. Cl.[2] F16L *1/00*; E21D *7/00*
U.S. Cl. 61—106 3 Claims



1. A method for the laying of the pipeline in a ground trench comprising the steps of

a. excavating a first pilot trench below ground level,

b. inserting into said pilot trench a trench shoring frame that provides lateral barriers to the inward movement of the sides of the pilot trench,

c. inserting a plurality of vertically disposed plate means downwardly into said pilot trench along two lines which are inwardly of and substantially parallel to the aforesaid lateral barriers,

d. forcing said two lines of plate means vertically downwardly into the earth to a level substantially below the level of the bottom of said pilot trench,

e. excavating the material between said two lines of plate means so as to form a second trench disposed below said pilot trench so that the sides of said second trench are fully supported by said two lines of plate means, the width of said second trench being less than the width of said pilot trench so that a ledge is formed between the bottom of said pilot trench and the top of said second trench,

f. inserting a pipe section into said second trench,

g. withdrawing said two lines of plate means vertically upwardly, and

h. supporting said trench shoring frame by ground level supporting means while advancing the trench shoring frame horizontally into an area which has been excavated for said first pilot trench, said advancement being achieved by applying hydraulic pressure between said trench shoring frame and a substantially stationary wall of earth.

3,969,905

METHOD AND APPARATUS FOR LAYING PIPELINES

Claudio Dolza, Strada del Nobile, 36-Turin, Italy

Filed Dec. 23, 1974, Ser. No. 535,672
Claims priority, application Italy, Jan. 22, 1974, 67169/74
Int. Cl.[2] F16L *1/00*
U.S. Cl. 61—111 11 Claims

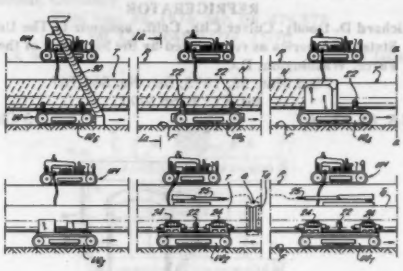
1. A method of laying large diameter pipelines, especially oil pipelines of, for example, one to two meters in diameter, comprising the steps of:

preparing an elongated excavation to receive a pipeline along the axis thereof;

supporting the end of an already completed length of pipeline on at least one operating trolley movable along the bottom of the excavation in which the pipeline is being laid;

lowering an additional length of pipeline into the excavation on to at least one further operating trolley movable along the excavation bottom ahead of the already completed pipeline;

positioning the end of the additional pipeline length in juxtaposition with the end of the already completed pipeline by use of the operating trolleys and utilizing welding equipment carried by the operating trolleys to weld the additional pipeline length to the already completed pipeline while the pipelines are in the excavation;



supplying power to the operating trolleys for movement thereof and for operating the welding equipment thereon from service vehicles movable along a service path outside of and to the side of the excavation; and

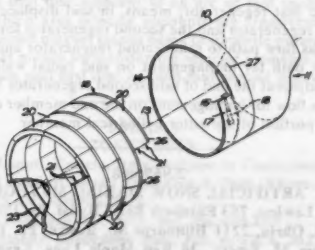
advancing the operating trolleys along the bottom of the excavation after connection of the additional pipeline length has been completed, so that said at least one operating trolley lays a further portion of completed pipeline on to the bottom of the excavation and said at least one further operating trolley is advanced ahead of the completed pipeline ready to receive a further pipeline length to be connected and laid on the bottom of the excavation.

3,969,906

TUNNELLING SHIELDS

Rupert John Sidney McBean, Croydon, England, assignor to Charcon Tunnels Limited, Great Britain

Division of Ser. No. 336,332, Feb. 27, 1973, Pat. No. 3,850,000. This application Sept. 13, 1974, Ser. No. 505,947
Claims priority, application United Kingdom, Mar. 2, 1972, 9751/72
Int. Cl.[2] E01G *3/00*
U.S. Cl. 61—85 2 Claims



1. An arcuate tunnel lining segment for a spiral tunnel lining, the segment having circumferential edges which extend along parallel spiral paths, each edge having an outerside and an inner side; and a single rebate formed along the outer side of only one of the circumferential edges of the segment to receive a spiral trailing edge of a tunnelling shield so that the

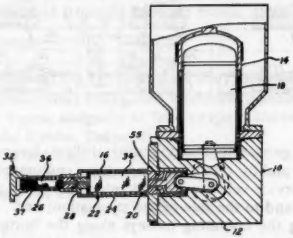
outside dimensions of the shield and the segment are substantially the same as the dimensions of the tunnel being formed so that no grouting is necessary between the outerside of the lining and the tunnel, the rebate having a radial depth which is relatively small in relation to the radial depth of the remainder of said one edge so that a bearing surface is provided on said one edge for action of hydraulic rams on said one edge to move the shield forward as the tunnelling advances, the other circumferential edge of the segment being plain.

3,969,907

COLD CYLINDER ASSEMBLY FOR CRYOGENIC REFRIGERATOR

Richard D. Doody, Culver City, Calif., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Mar. 25, 1975, Ser. No. 561,767
Int. Cl.[2] F25B *9/00*
U.S. Cl. 62—6 3 Claims



1. In a two-stage Vuilleumier cycle cryogenic refrigerator system; a cold cylinder assembly, comprising: an outer cylindrical member having a first portion, with a large diameter and a second portion, with a smaller diameter; a radial wall member interconnecting the large diameter portion of the cylindrical member to the smaller diameter portion, and forming the end wall for a first expansion volume adapted to be connected to a first heat load; an end member closing the smaller portion of said outer cylindrical member; said end member being adapted to be connected to a second heat load; a displacer member within said outer cylindrical member; said displacer having a first portion of a larger diameter adapted for movement within the larger diameter portion of the outer cylindrical member and a second portion of a smaller diameter adapted for movement within the smaller diameter portion of the outer cylindrical member; a first regenerator in the first portion of said displacer; a second regenerator in the second portion of said displacer; means for providing a gas flow path into said first regenerator; means, in said displacer between the first regenerator and the second regenerator for providing a first gas flow path to said second regenerator and a second gas flow path for impingement on said radial wall member; means adjacent the end of said second regenerator for providing a gas flow for impingement on the end member closing the smaller portion of the outer cylindrical member

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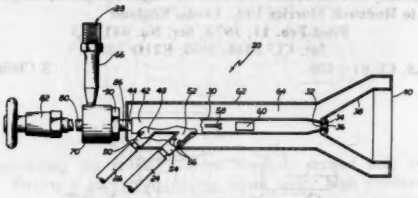
3,969,908

ARTIFICIAL SNOW MAKING METHOD

John F. Lawless, 753 Elizabeth Road, Rydal, Pa. 19046; Leonard J. Ohrin, 2211 Hilthorpe St., Roslyn, Pa. 19001, and William M. Emery, 36 Red Maple Lane, Levittown, Pa. 19055

Filed Apr. 29, 1975, Ser. No. 572,778
Int. Cl.[2] F25C *3/04*
U.S. Cl. 62—74 7 Claims

1. Apparatus for producing artificial snow and for providing the same to the ambient atmosphere comprising a thermally insulated mixing chamber, first means for providing water in the form of atomized droplets to said chamber, second means for providing first cold, compressed air to said chamber for expansion therein, third means for effectively cooling said first compressed air such that when said first compressed air expands in said chamber it is effective to reduce the temperature of said water droplets substantially below the freezing point of water, whereupon said water droplets instantly freeze, said



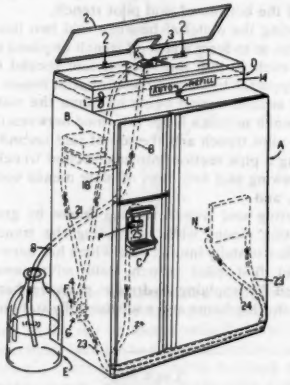
third means comprising a Vortex tube having second compressed air supplied thereto and operative for causing the second compressed air to flow in a gyratory, helical motion therethrough, whereupon a portion of said air exits said tube at temperatures substantially below the freezing point of water, and nozzle means connected to said chamber and through which said artificial snow exits to the ambient atmosphere.

3,969,909

REFRIGERATOR WATER RESERVOIR ASSEMBLY FOR THE AUTOMATIC ICE MAKER AND THE ICE WATER DISPENSER

Robert W. Barto, 2019 Duval Lane, Hayward, Calif. 94545, and Leonard A. Brown, 13229 Casa Vista, Poway, Calif. 92064

Filed Jan. 13, 1975, Ser. No. 540,553
Int. Cl.[2] F25C *1/04*
U.S. Cl. 62—179 3 Claims



1. A refrigerator having an automatic ice maker unit with a first water conveying conduit communicating with said unit and having a solenoid valve which will automatically open when the ice maker needs water;

a. a water reservoir containing water;

b. a motor driven pump that has a water inlet communicating with the water in said reservoir, said pump having a water outlet second conduit communicating with said solenoid valve; and

c. a water pressure sensitive switch in communication with said pump outlet, said switch being set to connect said

motor to a source of electricity for starting the motor and pump automatically when the water pressure in said pump outlet second conduit drops below a predetermined point;

d. whereby when said automatic ice maker unit starts operating and needs additional water to make ice it will open said solenoid valve and draw on the pressurized water in said water outlet second conduit for reducing the pressure therein and cause said water pressure sensitive switch to automatically close an electric circuit to said motor for operating said pump for feeding water from said reservoir through said pump and said water outlet second conduit through said valve and said first water conveying conduit to said automatic ice maker, the water flow continuing until said automatic ice maker unit completes its cycle and shuts off and until the water pressure in said second water conveying conduit builds up to the predetermined water pressure whereupon said pressure sensitive switch will open the electric circuit to said motor and will stop both the motor and the pump.

3. A refrigerator having an automatic ice maker unit and an ice water dispensing unit with a first water conveying conduit communicating with said ice maker unit and having a first solenoid valve which will automatically open when the ice maker requires water;

a. a second water conveying conduit communicating with said ice water dispensing unit and having water in said second conduit, and a second solenoid valve which will open when a water dispensing lever is depressed for delivering ice water, the depressing of said lever closing a switch which causes an electric current to open said second solenoid valve;

b. a water reservoir containing water;

c. a motor driven pump having a water inlet communicating with the water in said reservoir, said pump having a third water outlet conduit communicating with both of said solenoid valves;

d. a water pressure sensitive switch in communication with said pump outlet, said pressure switch being set to connect said motor to a source of electricity for starting the motor and pump automatically when the water pressure in said pump outlet conduit drops below a predetermined point;

e. whereby when said automatic ice maker unit starts operating and needs additional water to make ice it will automatically open said first solenoid valve and draw on the pressurized water in said first water outlet conduit for reducing the pressure therein and cause said pressure sensitive switch to automatically close an electric circuit to said motor for operating said pump for feeding water from said reservoir through said pump and said pump water outlet conduit thence through said first solenoid valve and said first water conveying conduit to said automatic ice maker, the water flow continuing until said automatic ice maker unit completes its cycle and shuts off said first solenoid valve and until said third water conveying conduit builds up to the predetermined water pressure whereupon said pressure sensitive switch will open the electric circuit to said motor and will stop both the motor and pump; and

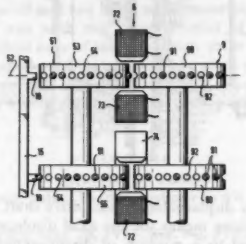
f. whereby when said ice water dispenser lever is depressed for dispensing ice water it will close said lever actuated switch for opening said second solenoid valve and draw on the pressurized water in said third pump water outlet conduit for reducing the water pressure therein and cause said water pressure sensitive switch to automatically close an electric circuit to said motor for operating said pump for feeding water from said reservoir through said pump and its water outlet conduit, thence through said second solenoid valve and said second water conveying conduit to said ice water dispenser, the water flow continuing until said lever is released and opens the lever switch and until the water pressure in said second water conveying conduit and said third pump water outlet conduit to build up to the predetermined water pressure whereupon said water pressure sensitive switch will open the electric circuit to said motor and will stop both the motor and the pump.

3,969,910

SELECTION APPARATUS FOR PATTERN CONTROL ELEMENTS

Franz Deisinger, Ingolstadt; Gert Hüsges, Zuchering, Seehof; Erich Bock, Feldkirchen; Heinrich Niestroj, and Detlef Henzgen, both of Ingolstadt, all of Germany, assignors to Schubert & Salzer Maschinenfabrik Aktiengesellschaft, Ingolstadt, Germany

Filed May 30, 1974, Ser. No. 474,579
Int. Cl.[2] D04B *15/74, 15/76*
U.S. Cl. 66—50 R **7 Claims**



1. In a textile machine having a series of substantially equally spaced textile processing implements, program means for indicating sequence of selection of the processing implements, a plurality of selector elements, each movable between an inoperative and an operative position for selecting processing implements in accordance with the program means, selector element store means for receiving the selector elements in their inoperative positions, and selector element support means for supporting the selector elements in their operative positions and including socket means for receiving the selector elements, the socket means being spaced apart and defining a pitch corresponding to the pitch of the textile processing implements, apparatus for selectively moving the selector elements between their inoperative and operative positions comprising a first disc in the selector element store means including first magnet means for maintaining unselected selector elements on said first disc, a second disc in the selector element support means carrying the socket means and including second magnet means for maintaining selected selector elements on said second disc, said discs being disposed with an arc of said first disc adjacent to an arc of said second disc between which arcs selector elements are transferred, said first and second magnet means being of opposite polarity, and third magnet means for transferring selector elements along a path between said first disc arc and said second disc arc.

3,969,911

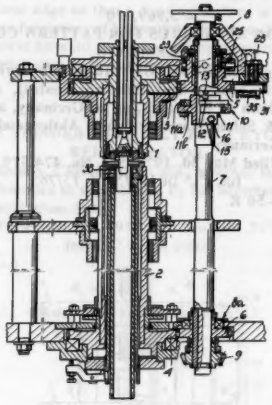
TOE CLOSER

Francesco Lonati, Brescia, Italy, assignor to Costruzioni Meccaniche Lonati di Lonati Francesco & Figli (Ettore, Faust, Tiberio) S.n.c., Bresica, Italy

Filed Jan. 31, 1975, Ser. No. 545,869
Claims priority, application Italy, Feb. 6, 1974, 20229/74
Int. Cl.[2] D04B *15/02*
U.S. Cl. 66—95 **9 Claims**

1. A circular knitting machine for stockings with a lower and an upper support structure for knitting elements, said upper and lower support structure being rotationally operated by corresponding gear wheels arranged on a common drive shaft, and with a coupling joint between at least one of said

gear wheels and said drive shaft, wherein said coupling joint comprises a substantially flanged element rigid with said drive shaft and provided with means for removable engagement with said one gear wheel and said one gear wheel is mounted



idly and axially displaceable on said drive shaft, the machine further comprising means for the axial displacement of said one gear wheel to a position of disengagement from said substantially flanged element, said means being responsive to a machine program.

3,969,912

PATTERNING MEMORY FOR CIRCULAR KNITTING MACHINE

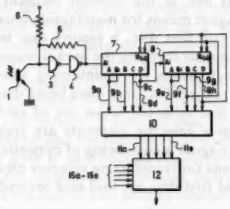
Ivo Kouklik, Trebic, Czechoslovakia, assignor to Elitex, Zavody textilniho strojirenstvi generalni reditelstvi, Liberec, Czechoslovakia

Filed July 8, 1974, Ser. No. 486,322

Claims priority, application Czechoslovakia, July 12, 1973, 5009-73

Int. Cl.² D04B *15/66*

U.S. Cl. 66—154 A **5 Claims**



1. In a circular knitting machine having a plurality of needles operable to knit yarn into a plurality of loops in wales and courses, a patterning memory having means for the storage of a knitting pattern and an output for the control of the needles with respect thereto derived from an input based upon the position of the needles and the particular course of the knitwork, the improvement for reading said patterning memory comprising means for counting the passage of both said needles and said courses from an initial point, said counters having a capacity to read the total number of needles and the total course passage from said initial point and said patterning memory having a capacity significantly smaller than said total number of needles and the total course passage, and a decoder interposed between each of said counters and said inputs of said patterning memory to reduce the output of said counters to the capacity of said patterning memory.

3,969,913

CONTRA-FLOW WASHING MACHINE

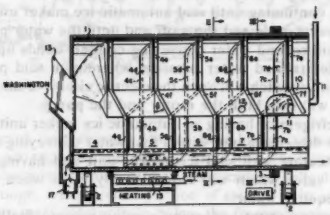
Karl Schaper, Triftstr. 25, D 3203 Sarstedt, Germany

Filed Oct. 21, 1974, Ser. No. 516,432

Claims priority, application Germany, Oct. 22, 1973, 7337934[U]

Int. Cl.² D06F *37/08*

U.S. Cl. 68—143 **2 Claims**



1. A contra-flow washing machine comprising a horizontal drum, driving means for rotating said drum for washing by oscillatory motion alternatively in one direction and in reverse direction and for driving and conveying motion of the washing in a single direction only, a plurality of partition means for subdividing each cross section part of the interior of said drum into a plurality of zones of washing and for conveying the washing from one of said zones of washing into the next adjacent one, a plurality of partition means within each cross section of said drum, each of said partition means including a flat partition part transverse to the axis of the drum and a following guide part spirally inclined to said flat partition part inside the drum, of which at least one part is disposed within the range of oscillatory motion of the drum for the washing process.

3,969,914

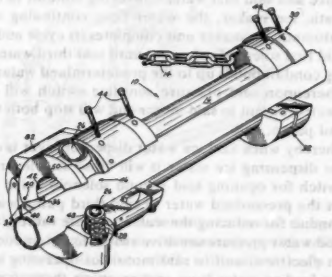
FLEXIBLE CORD LOCKING DEVICE

Robert S. Dennen, Littleton, Colo., assignor to Recreational & Scientific Devices, Inc., Littleton, Colo.

Filed July 21, 1975, Ser. No. 597,525

Int. Cl.² B62H *5/00*

U.S. Cl. 70—234 **12 Claims**



1. A flexible cord locking device adapted to be clamped on a bar comprising co-operating first and second body portions having hinge means for pivotally interconnecting said body portions along one side thereof, said body portions co-operating to define throughout the length thereof a recess through

which a support bar upon which the locking device is to be mounted is received, means for securing said body portions in clamped relationship including locking portions on said first and second body portions which co-operate when the body portions are brought together to define a locking channel, a cord reel having separable first and second sections supported on said body portions for rotation relative thereto, a flexible cord secured at one end to said reel and having a lock bolt connected to the free end thereof, releaseable locking means associated with said locking channel and operable to engage and lock said locking bolt when inserted into said locking channel to thereby secure the flexible cord to said body portions and prevent opening of said body portions.

3,969,915

LOCK

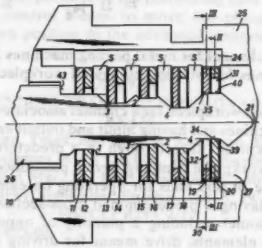
Klaus Droske, Gifhorn, Germany, assignor to Volkswagenwerk Aktiengesellschaft, Wolfsburg, Germany

Filed Aug. 23, 1974, Ser. No. 500,193

Claims priority, application Germany, Sept. 29, 1973, 2349182

Int. Cl.² E05B *15/14, 19/06, 29/06*

U.S. Cl. 70—364 R **4 Claims**



1. In a cylinder lock, the combination which comprises:

a. a non-rotatable part having an axially extending chamber and recess means communicating with said chamber;

b. a plug arranged in said chamber of said non-rotatable part for rotation about an axis;

c. a reversible key axially insertable into said plug, from the same axial end thereof, while the key is in either of two angular positions;

d. a plurality of plate-shaped tumblers slidably mounted on said plug for movement transverse to said axis into and out of said recess means, said tumblers preventing rotation of said plug when at least one of said tumblers extends into said recess means, each of said tumblers having an opening through which said key, when inserted into said plug, may extend, said openings of said tumblers having respective contours which provide at least two contact edges which are next to each other and which are stepped in said transverse direction of movement of said tumblers, said tumblers being arranged in pairs, the tumblers of each pair being identical and located next to each other but oriented to occupy positions which are angularly displaced with respect to each other by 180° about said axis; and

e. spring means associated with said tumblers for continually biasing the same for movement into said recess means, the spring means associated with the two tumblers of each pair urging said two tumblers in opposite directions;

f. said key having two parallel axially extending longitudinal edges each of which engages a contact edge of at least one of said tumblers for pressing the respective tumbler against the action of its associated spring means out of said recess means, said longitudinal edges of said key being arranged at least approximately opposite each other and each engaging one contact edge of a respective one of the two tumblers of each pair, each longitudinal edge of said key when the same is inserted in the lock, and the respective contact edge of the respective tumbler engaged thereby when such tumbler is out of said recess means, being spaced the same distance from said axis such that upon interengagement of said key and tumblers, the latter are maintained out of said recess means, the distance which each longitudinal edge of said key, at the point along its length where such edge is in axial alignment with a given tumbler but is out of engagement with any contact edge thereof, is spaced from said axis being the same as the distance which the non-engaged contact edge of such tumbler is spaced from said axis, the distance which each longitudinal edge of said key is spaced from said axis being constant throughout that portion of the length of the key which, when the key is inserted in the lock, is aligned with a pair of tumblers, said longitudinal edges of said key being non-symmetrical with respect to said axis such that upon reversal of said key, that longitudinal edge of said key which, prior to reversal, did not engage one of the tumblers of a given pair of tumblers is opposite and in contact with the contact edge of such tumbler which, prior to such reversal, was not contacted.

3,969,916

ISOSTATIC PRESS

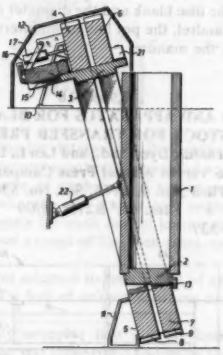
Robert Wiberg, Ystad, Sweden, assignor to AB Carbox, Ystad, Sweden

Filed May 20, 1975, Ser. No. 579,248

Claims priority, application Sweden, June 10, 1974, 7407649

Int. Cl.² B21D *26/04*; **B21C** *35/00*

U.S. Cl. 72—56 **6 Claims**



1. An isostatic press, comprising:

a frame for receiving a pressure vessel which is relatively tall in relation to its width, said pressure vessel including a movable lid for closing the vessel to enclose workpieces and tools together with a pressure fluid in said vessel, the pressure fluid being pressurized after the pressure vessel has been introduced into the frame, said frame absorbing forces substantially in the longitudinal direction of the vessel;

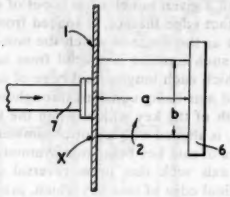
pivot means for pivotally coupling said frame and the pressure vessel in relation to one another; and

means for producing a relative pivoting movement between said frame and the pressure vessel so as to give access to the top end of the pressure vessel.

3,969,917
HEAT TREATMENT POTS

Frederick David Waterfall, Harborne, England, assignor to Frederick David Waterfall

Filed Mar. 26, 1974, Ser. No. 454,865
Claims priority, application United Kingdom, Apr. 3, 1973, 15852/73; June 30, 1973, 31266/73
Int. Cl.² B21D 22/16
U.S. Cl. 72—69 21 Claims

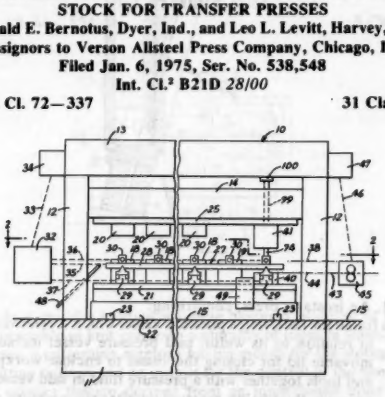


1. A method of producing a heat treatment pot having sufficient strength and resistance to chemical attack to resist wall failure over a useful service life when holding molten salts, comprising: providing a circular disc blank of metal sheet of a thickness of at least about 3/16 inch, said blank comprising heat resisting nickel chromium alloy; providing a mandrel having a parallel-sided cylindrical surface and a flat circular end face; and shaping the blank into a pot having substantially parallel sides by a metal spinning process which includes, at least in the final stages, applying the blank to the flat circular end face of the mandrel, pressing a spinning element against the blank to shape the blank into engagement with the cylindrical wall of the mandrel while controlling the spinning process to produce a pot body having a depth which is not greater than 110% of the difference between the initial diameter of the disc blank and the diameter of the circular end face of the mandrel, the pot having an internal shape complementary with the mandrel.

3,969,918
METHOD AND APPARATUS FOR BLANKING COIL STOCK FOR TRANSFER PRESSES

Donald E. Bernotus, Dyer, Ind., and Leo L. Levitt, Harvey, Ill., assignors to Verson Allsteel Press Company, Chicago, Ill.

Filed Jan. 6, 1975, Ser. No. 538,548
Int. Cl.² B21D 28/00
U.S. Cl. 72—337 31 Claims

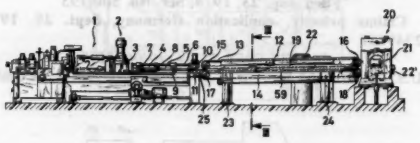


1. A method for blanking from coil stock blanks to be supplied to and formed in a transfer press having a transfer feed line through the press along which the blanks are fed, comprising the steps of intermittently feeding the coil stock over an upwardly facing lower male blanking punch along a coil stock feed line which is located below the transfer feed line of the press, lowering a downwardly facing upper female blanking die from above the transfer feed line of the press over the male blanking punch for blanking blanks from the coil stock, raising the female blanking die above the transfer feed line of the press, elevating the blanks from the male blanking punch to the transfer feed line of the press for transfer thereof along the transfer feed line, and discharging the scrap of the coil stock along the coil stock feed line below the transfer feed line of the press.

3,969,919
WORKPIECE FEED CHANNEL

Alfons Goeke, Solingen, Germany, assignor to Th. Kieserling & Albrecht, Solingen, Germany

Filed July 10, 1975, Ser. No. 594,732
Claims priority, application Germany, July 12, 1974, 2433600
Int. Cl.² B21D 3/04
U.S. Cl. 72—405 23 Claims



1. A feed channel for metal peeling machines and straightening machines for working elongated workpieces, comprising:

an elongated workpiece feed channel associated with one of said machines and having input and output ends for carrying workpieces therethrough in a predetermined direction, a workpiece handling device positioned adjacent at least one of said ends for operating on elongated workpieces having a predetermined cross-sectional size, said feed channel including a plurality of opposed pairs of profiled elements, drive means for driving said opposed pairs of profiled elements in said predetermined direction, each said pair of opposed profiled elements defining a workpiece receiving opening therebetween having a cross-sectional size approximately 1.5 to 10 times larger than said predetermined cross-sectional size of said workpiece.

3,969,920
SPLICER FOR REINFORCING BARS

Ronald Eric Marsden; Franklyn Walter Webb, and George Rukavina, all of Mississauga, Canada, assignors to Stricon Products Limited, Mississauga, Canada

Filed June 25, 1974, Ser. No. 482,927
Claims priority, application Canada, June 28, 1973, 175205
Int. Cl.² B21D 39/04
U.S. Cl. 72—415 6 Claims

1. A tool for applying radial forces to a tension splicer to deform the splicer radially into contact with adjacent end portions of reinforcing bars arranged in end-to-end alignment within the splicer, the tool comprising:

a housing;

a plunger movable longitudinally in the housing and normally in a withdrawn position;

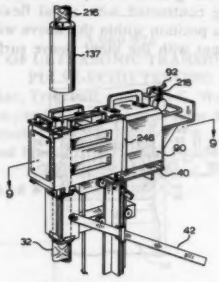
control means coupled to the housing and operable to cause the plunger to move longitudinally between an advanced position and said withdrawn position;

a die holder coupled to the plunger for movement with the plunger;

an action die disposed about a transverse axis and held in place by the die holder;

a pair of side members releasably coupled to the housing and projecting longitudinally from the housing in parallel relationship, the side members being independently movable in parallel with said transverse axis to remove the side members from the housing; and

a reaction die releasably coupled to the side members remote from the housing and disposed about a second transverse axis parallel to the first mentioned transverse axis, and movable in parallel with said transverse axes relative to the side members to remove the reaction die



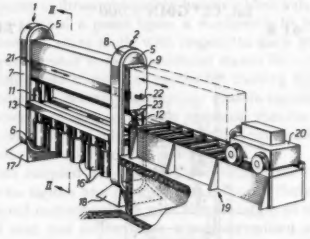
from the side members, the reaction die combining with the action die to compress the splicer into engagement with the end portions of the reinforcing bars upon operating the control means to move the plunger from the withdrawn position to the advanced position.

3,969,921

METAL BENDING PRESS WITH REMOVABLE UPPER BEAM

Finn L. Jonsson, Ystad, and Rune G. Adolfsson, Boras, both of Sweden, assignors to AB Carbox, Ystad, Sweden

Filed Mar. 31, 1975, Ser. No. 563,308
Claims priority, application Sweden, Apr. 5, 1974, 7404632
Int. Cl.² B21J *9/12*
U.S. Cl. 72—453.06 **11 Claims**



1. A press, particularly for press bending of plates, comprising:

two spaced apart end frames (**1, 2**), each of said end frames (**1, 2**) including two spaced apart columns (**3, 4**) interconnected at the top and bottom via yokes (**5, 6**), and a tension biased wire bandage (**7, 8**) surrounding and pressing together said columns and yokes to form a force-absorbing frame;

upper and lower beams (**9, 10**) mounted between said end frames (**1, 2**) with a press gap being formed between said upper and lower beams, end portions of said beams being received in the respective spaces formed between said spaced apart columns of said end frames and said upper beam (**9**), in its unloaded state, being arranged to be laterally movable relative to said end frames (**1, 2**) through said space in at least one end frame (**2**) to permit the removal and reinsertion of a workpiece in the press;

means (**11, 12**) for forcing said upper beam (**9**), in the working position thereof, towards the upper yokes (**5**) of the end frames (**1, 2**); and

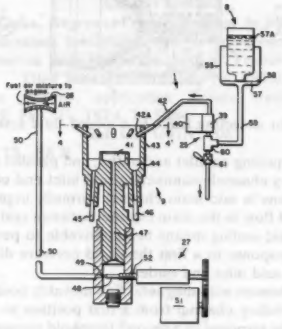
hydraulic cylinder means (**16**) loadably mounted along both sides of said lower beam (**10**) and including means for supporting a pressing tool (**13**) which has at least two force carrying surfaces (**14, 15**) located on respective opposite sides of a longitudinal center line of said lower beam (**10**) and extending over a substantial length of said pressing tool (**13**), said hydraulic cylinder means (**16**) being operable for selectively raising and lowering said pressing tool (**13**) relative to said upper beam (**9**), said hydraulic cylinder means (**16**) being mounted substantially in registration with said force carrying surfaces (**14, 15**) of said pressing tool (**13**) for supporting said pressing tool (**13**) substantially along said force carrying surfaces (**14, 15**) thereof.

3,969,922

APPARATUS FOR FEEDING FUEL TO AN ENGINE

W. Barry Baker, Newark; John Charles Kochur, New Castle, both of Del., and Estel McKinley Stoneman, Pennsville, N.J., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed June 19, 1975, Ser. No. 588,644
Int. Cl.² G01L *23/22;* **F02M** *43/00*
U.S. Cl. 73—35 **2 Claims**



2. In an apparatus for determining the octane numbers of fuels of unknown octane numbers that are fed to a knock test engine from a source of each fuel of known and unknown octane numbers wherein said knock test engine generates knock intensity signals for each fuel of known and unknown octane numbers over a range of fuel feed-rates, said apparatus comprising:

fuel feed means adapted to feed a fuel of known octane number and a fuel of unknown octane number to the test engine,

a knock intensity receptor that accepts knock intensity signals from the test engine and transmits them to memory means,

memory means that store knock intensity signals transmitted by the receptor and transmit such signals to the calculating means,

calculating means that compare knock intensity signals of known and unknown octane fuels to determine unknown octane numbers,

wherein the improvement comprises said fuel feed means having a feeding apparatus between the fuel source and the knock test engine by means of which there is cooperation between the furl source and a spill chamber surrounded by an overflow trough, through a feed line having an on-off valve along its length and an exit to said chamber, said chamber feeding fuel to said knock test engine, said feeding apparatus characterized in that:

a. the feed line and on-off valve are related to fuel flow direction in that said feed line and on-off valve are posi-

tioned so that fuel in the feed line travels generally in a direction away from gravity pull immediately before and after passing through said valve, and

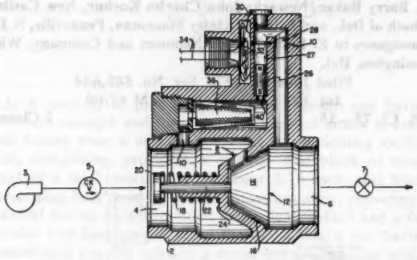
b. the feed line exit is fixedly positioned to direct a jet of fuel into the chamber when the valve is turned on and to drip leaking fuel into said trough surrounding the chamber when the valve is turned off.

3,969,923

LEAK DETECTOR

Jack M. Howell, Lighthouse Point, Fla., assignor to Valcor Engineering Corporation, Kenilworth, N.J.

Filed Aug. 29, 1975, Ser. No. 608,826
Int. Cl.² G01M *3/28*; F17D *3/04*
U.S. Cl. 73—40.5 R **7 Claims**



1. Means for detecting leaks in a closed fluid system comprising:

means comprising an inlet and outlet, and parallel main and secondary channels connecting said inlet and outlet,

sealing means in said main channel normally urged to prevent fluid flow in the main channel between said inlet and outlet, said sealing means being movable to permit such flow in response to a first threshold pressure differential between said inlet and outlet,

a sensing element with magnetic flux movably positioned in said secondary channel from a first position to a second position in response to a second threshold pressure differential applied between said inlet and outlet passages, said second pressure differential threshold being less than said first pressure differential threshold, and

switch means adjacent said magnetic flux when said sensing element is in one of said first and second positions, said switch means being responsive to said magnetic flux for indicating when the sensing element is in said one position whereby such element occupies such position whenever said second pressure differential threshold is exceeded, whereby leakage downstream of the outlet causes a pressure drop across said secondary channel sufficient to move the sensing element to its second position. such movement being detected by the switch means.

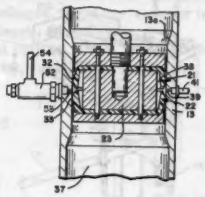
3,969,924

FLUID FLOW CONTROL APPARATUS AND METHOD

Marvin H. Grove, Houston, Tex., assignor to M & J Valve Company, Houston, Tex.

Filed May 2, 1975, Ser. No. 573,904
Int. Cl.² G01M *3/28*
U.S. Cl. 73—46 **9 Claims**

1. In a fluid flow control apparatus, a sleeve having an inner cylindrical surface and a converging entrant portion at at least one end of the same, means forming liquid enclosing spaces communicating with the ends of the sleeve, a plunger assembly, means serving to carry the plunger assembly for movement axially of the sleeve between positions within and retracted out of the sleeve, and sealing means carried by the plunger assembly and serving to establish a seal between said spaces when the plunger is within the sleeve, the sealing means comprising two cup-shaped seaing members of resilient material, each member having a base portion and an annular rim portion, the outer periphery of the rim portion having an annular sealing area located intermediate the base portion and the free edge of the rim portion, the rim portion when relaxed being of a diameter greater than the inner diameter of the sleeve and being contracted with radial flexing of the rim when moved to a position within the sleeve with said area in sealing engagement with the inner sleeve surface, said cup-



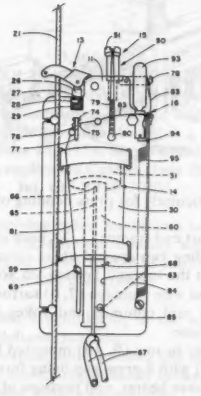
shaped sealing members being spaced along the axis of the plunger and having the free edges of their rim portions faced toward each other, and means for mounting the sealing members, said means forming a closed annular space surrounded by the rims of the sealing members, successive contraction and radial flexing of the rim portions as the plunger is moved into the sleeve serving to trap liquid thereon under pressure greater than the static pressure in the space from which the plunger is moved, said pressure serving to urge the rim portions in an outward radial direction to press said sealing means against the inner sleeve surface.

3,969,925

IN SITU OCEANOGRAPHIC SAMPLE SEPARATOR

Shale Jack Niskin, Miami, Fla., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sept. 16, 1975, Ser. No. 613,843
Int. Cl.² G01N *15/00*
U.S. Cl. 73—61 R **17 Claims**



1. A deep water sampling device and in situ separator of particulate matter comprising:

a cylindrical sample chamber having end closure means;

means for admitting ambient water into said chamber at a selected depth;

a labeling liquid in said device and means for introducing said liquid in situ into said chamber upon said chamber receiving a selected volume of ambient water;

means for retaining particulate matter in said device upon evacuation of said volume of water; and

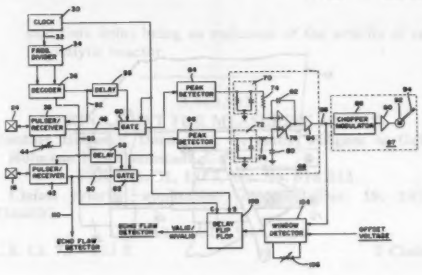
means for evacuating in situ said volume of water, whereby particulate matter may be separated from a water sample in situ and examination and counting thereof may be commenced as soon as said device is retrieved and said retaining means is removed from the device.

3,969,926

ALIGNMENT OF ULTRASONIC TRANSDUCER PROBE IN PULSE-ECHO TESTING

Philip A. Walker, Trumbull, and Karl G. Walther, Ridgefield, both of Conn., assignors to Krautkramer-Branson, Incorporated, Stratford, Conn.

Filed Mar. 27, 1975, Ser. No. 562,550
Int. Cl.² G01N 29/04
U.S. Cl. 73—67.8 S **17 Claims**



1. An apparatus for use in immersion pulse-echo ultrasonic testing comprising:

transducer means comprising a test probe means and alignment determining probe means disposed in fixed spatial relationship with each other and each providing when energized and acoustically coupled to a workpiece respective ultrasonic energy beams whose axis are converging toward a point upon a workpiece to be tested and form an acute angle with respect to each other;

means coupled to said transducer means for cyclically energizing said transducer means for causing said transducer means to transmit ultrasonic search signals toward the workpiece and receive in response thereto echo signals arising from such search signals being incident upon a selected surface of the workpiece;

means coupled to said transducer means for receiving said echo signals and providing in response thereto an output signal commensurate with the deviation of the beam axis of said test probe from a predetermined angle of incicence upon a selected surface of the workpiece, and

positioning means coupled to said transducer means and receiving said output signals for positioning said transducer means responsive to said output signal.

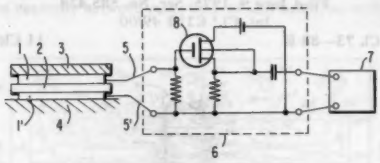
3,969,927

VIBRATION MEASURING AND THE APPARATUS THEREFOR

Masafumi Yoshida; Naohiro Murayama, and Hiroshi Obara, all of Iwaki, Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 8, 1974, Ser. No. 495,740
Claims priority, application Japan, Aug. 8, 1973, 48-88959
Int. Cl.² G01H 1/00
U.S. Cl. 73—71.4 **3 Claims**

1. A method of measuring or detecting vibration comprising uniformly contacting one of the surfaces of a piezoelectric element comprising a polarization treated polyvinylidene fluoride piezoelectric film having a metal thin film as electrodes deposited on both surfaces thereof with an object to be measured while covering the opposite surface of said piezoelectric element contacted with the object to be measured with a soft polymer film having a lower Young's modulus than



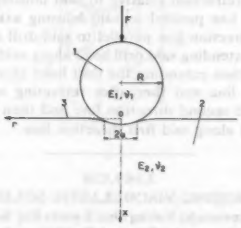
said polyvinylidene fluoride piezoelectric film, and measuring or detecting the vibration of the object by the changes in the electric field caused by the vibration of the object on the surface of said piezoelectric element.

3,969,928

NON-DESTRUCTIVE TESTING METHOD FOR DETERMINING A BODY'S MECHANICAL PROPERTIES AND STRESSES

Joseph Zarka, Bagneux, France, assignor to SKF Compagnie d'Applications Mecaniques and Anvar, Agence Nationale de Valorisation de la Recherche, both of, France

Filed June 25, 1974, Ser. No. 483,022
Claims priority, application France, June 26, 1973, 73.23319; Feb. 21, 1974, 74.5884
Int. Cl.² G01N 3/08
U.S. Cl. 73—88 R **18 Claims**



1. A non-destructive testing method for determining the elastic limit of a body or part as a function of depth suitable for a part having been subjected to surface treatment comprising:

a. subjecting the surface of said part to an increasing pressure exerted by a series of punches, each punch having a contact surface with a different radii of curvature;

b. measuring the deformation in the vicinity of the punch of the surface of said part for each punch pressure;

c. measuring the force (F_{el}) at which the deformation for each punch ceases to be elastic;

d. removing the pressure applied to each punch in order that the surface deformation to the part is reversible;

e. constructing a curve for each punch from the force (F_{el}) data representing the relation between the main stresses as a function of depth; and

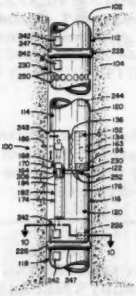
f. constructing an envelope-curve over each of said curves in step (e) whereby said envelope-curve represents the elastic limit of the part as a function of the depth.

3,969,929

DRILL MODULE FOR BOREHOLE STRESS MEASURING INSTRUMENT

Garrett D. Shaw, Rancho Palos Verdes Peninsula, and Clyde E. Williamson, Torrance, both of Calif., assignors to TRW Inc., Redondo Beach, Calif.

Filed June 9, 1975, Ser. No. 585,428
Int. Cl.[2] E21B 49/00
U.S. Cl. 73—88 E 11 Claims



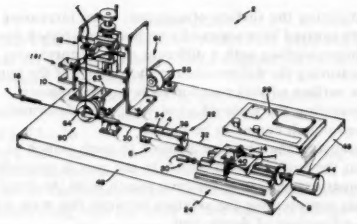
1. A drill module for a holographic borehole stress measuring instrument having an elongate holographic optics module, comprising:
an elongate support housing;
coupling means on an end of said housing for releasably connecting the housing to one end of said optics module in end-to-end relation with said optics module;
a drill head at said one housing end for supporting a drill with its axis transverse to the longitudinal axis of said housing;
means supporting said drill head on said housing for extension and retraction relative to said housing along a first direction line parallel to said housing axis and along a second direction line parallel to said drill axis; and
means for extending said drill head along said first direction line and then extending the drill head along said second direction line and thereafter retracting said drill head along said second direction line and then retracting the drill head along said first direction line.

3,969,930

TESTING VISCOELASTIC SOLIDS

Dusan Ciril Prevorsek; Young Doo Kwon; Raj Kumar Sharma, all of Morristown, and Edward T. Gilliam, Lake Hiawatha, all of N.J., assignors to Allied Chemical Corporation, Morris Township, N.J.

Filed Apr. 10, 1975, Ser. No. 567,144
Int. Cl.[2] G01N 3/34
U.S. Cl. 73—91 26 Claims



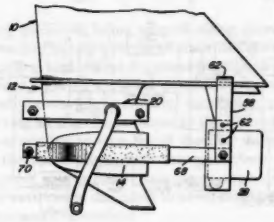
1. An apparatus for testing a viscoelastic material, comprising:
a holding means connected to the material for holding the material in a predetermined position during testing;
a pretension means coupled to the material for applying tension to the material during testing;
a displacement generator having an eccentric means coupled to the material for applying cyclic displacement to the material; and
a mechanical-electrical transforming means coupled to the material for transforming mechanical motion into electrical signals.

3,969,931

POWER TESTER FOR OUTBOARD DRIVE ASSEMBLIES

Charles T. Lanning, 303 NW. 10th St., Watertown, S. Dak. 57102

Filed Mar. 31, 1975, Ser. No. 563,516
Int. Cl.[2] G01M 15/00
U.S. Cl. 73—117.1 14 Claims



1. In combination with a marine drive assembly of the type including an upstanding power leg having a lower end gear housing extending in a front-to-rear direction and including a rotary propeller shaft projecting rearwardly outwardly from said housing adapted to have a marine propeller mounted thereon, said power leg also including a laterally outwardly projecting peripheral cavitation plate spaced above the gear housing and propeller shaft, a fluid pressure pump including a rotary input shaft, a fluid inlet and a fluid outlet means, means drivingly coupling said propeller shaft to said input shaft, control valve means operatively associated with said outlet means for variably controlling the flow of fluid from said pump through said outlet means, and mounting means connected to said pump and releasably supported from said power leg stationarily supporting said pump from said power leg.

3,969,932

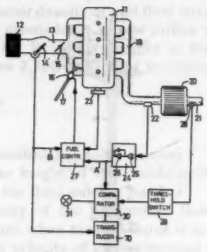
METHOD AND APPARATUS FOR MONITORING THE ACTIVITY OF CATALYTIC REACTORS

Franz Rieger, Wasseralfingen; Ernst Linder, Muhlacker, and Peter Jürgen Schmidt, Schwieberdingen, all of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Aug. 13, 1975, Ser. No. 604,320
Claims priority, application Germany, Sept. 17, 1974, 2444334
Int. Cl.[2] G01M 15/00
U.S. Cl. 73—118 11 Claims

1. A method for monitoring the activity of a catalytic reactor used in association with an internal combustion engine with fuel control, comprising the steps of:
A. providing an exhaust gas composition sensor at the inlet and at the outlet of said catalytic reactor;
B. finding a predetermined operational state of said internal combustion engine;
C. initiating a change of the output signals of said exhaust composition sensors; and
D. measuring the time delay between the occurrence of the

change of output signals from said exhaust composition sensors;



said time delay being an indicaton of the activity of said catalytic reactor.

3,969,933

SPRING JOINT FOR MEASURING DEVICE

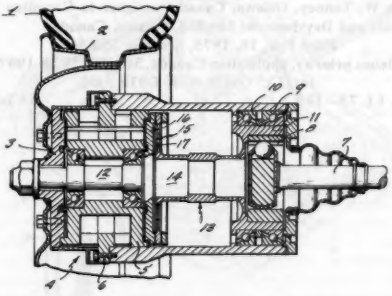
Gunther Himmler, Darmstadt, Germany, assignor to Gebr. Hofmann KG, Darmstadt, Germany

Filed Oct. 21, 1974, Ser. No. 516,813

Claims priority, application Germany, Dec. 18, 1973, 7344802

Int. Cl.² G01L 5/16, 5/20

U.S. Cl. 73—133 R 2 Claims



1. A homo-kinetic joint interconnecting a measuring arrangement and a drive unit, said measuring arrangement comprising a wheel shaft rotatably supported by a measuring hub that measures forces and moments acting on a wheel connected to said measuring arrangement, said joint comprising a diaphragm connected to said wheel shaft and flexible in the axial direction but rigid in a peripheral direction and a cylindrical tube coupled at one end to said diaphragm and connected at the other end to said drive unit, said tube functioning as a bar spring which, while axially rigid, is radially resilient.

3,969,934

LOAD CELL AMPLIFIER

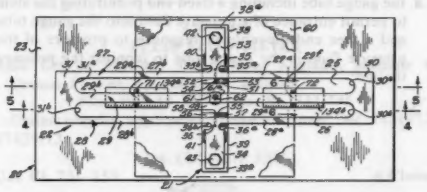
Seymour H. Raskin, P.O. Box 35549, 6901 Forest Park, Dallas, Tex. 75235

Continuation-in-part of Ser. No. 280,772, Aug. 15, 1972, Pat. No. 3,837,222. This application Sept. 16, 1974, Ser. No. 506,318

Int. Cl.² G01L 1/04

U.S. Cl. 73—141 A 24 Claims

1. A load cell comprising: a beam having a neutral axis; a pair of bearing members spaced from and parallel to said beam; end portions connecting outer ends of said beam and said bearing members; a pair of support members spaced outwardly of the bearing members and connected at at longitudinally central portions of the bearing members for supporting the bearing members; load support means secured to said beam centrally between outer ends of said beam; an indicator



arm, said indicator arm being spaced equidistantly between one end of said beam and said load support means; and means securing said indicator arm to said beam such that upon deflection of said beam the angular relationship between said indicator arm and the neutral axis of the beam at the point of attachment of the indicator arm to the beam is unchanged.

3,969,935

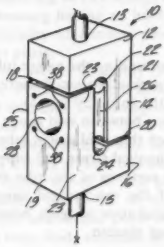
LOAD CELL

Ralph S. Shoberg, Farmington Hills, Mich., assignor to GSE, Inc., Farmington Hills, Mich.

Filed Oct. 29, 1974, Ser. No. 518,455

Int. Cl.² G01L 1/22

U.S. Cl. 73—141 A 6 Claims



1. A single axis force transducer comprising: a solid body of high modulus of elasticity material having a longitudinal axis of sensitivity, said body being configured to define first and second longitudinally spaced transverse slots oppositely opening into the body, said slots defining first and second end portions and a central flexure portion acting as a shear-link between said end portions, a bore formed through said central portion creating stress concentrating flexure areas on opposite sides thereof, and strain gage means disposed on said flexure areas in orthogonal pairs and responsive only to shear forces in the flexure areas as a result of a load having a component applied along the longitudinal axis of the transducer, said bore being formed between said slots and perpendicular to the longitudinal axis of the transducer body.

3,969,936

INFLATION VALVE GAUGE

James E. Lindsay, 24712 Evereve Circle, El Toro, Calif. 92630

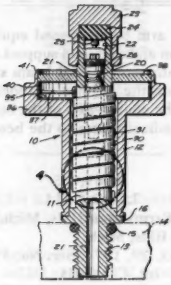
Continuation-in-part of Ser. No. 394,108, Sept. 4, 1973, abandoned. This application May 14, 1975, Ser. No. 577,173

Int. Cl.² B60C 23/04

U.S. Cl. 73—146.8 5 Claims

1. An inflation valve gauge for connection to a pressurized means subject to high mechanical stress, said gauge comprising:

a. a tubular stem connected to the pressurized means;
b. an inflation valve sealing the tubular stem;
c. a pressure gauge tube wrapped about the stem in the form of a cylindrical helix in close proximity thereto but normally spaced therefrom a distance of the order of 0.005 to 0.010 inches and with the coils thereof normally spaced apart about 0.003 inches;
d. the gauge tube including a fixed end penetrating the stem to permit entrance of a pressure fluid into the gauge tube and a free end movable in response to pressure of the pressure fluid in the gauge tube to monitor the pressure thereof;



e. and a sleeve surrounding the gauge tube in close proximity thereto but normally spaced therefrom a distance of the order of 0.015 to 0.020 inches;
whereby the spacing between said gauge tube and said stem and sleeve is such that said gauge tube is elastically movable under mechanical stress into supported contact with the confronting surfaces of the tube and sleeve whereby, upon release of the mechanical stress, the gauge tube returns to its initial state to again monitor the pressure of the pressure fluid therein.

3,969,937

METHOD AND APPARATUS FOR TESTING WELLS

Burchus Q. Barrington; David L. Farley, and O. L. Morrisett, all of Duncan, Okla., assignors to Halliburton Company, Duncan, Okla.

Continuation-in-part of Ser. No. 517,488, Oct. 24, 1974. This application Sept. 12, 1975, Ser. No. 612,841
Int. Cl.² E21B *47/00*
U.S. Cl. 73—151 **26 Claims**

1. A method of testing a formation in a zone intersected by a well bore, comprising the steps of:
a. maintaining hydrostatic pressure on the formation with a column of first liquid in the well bore, said hydrostatic pressure exceeding the formation pressure at the zone;
b. positioning a conduit, having closed valve means interposed therein closing the conduit to fluid flow therethrough, in the well bore with the lower end of the conduit opening proximate to the zone under test;
c. introducing a quantity of a second liquid into the conduit;
d. isolating the annulus above the zone under test from said zone;
e. opening the valve means in the conduit;
f. allowing fluid from the formation in the zone under test to enter the lower end of the conduit and flow a distance therethrough;
g. trapping a sample of the formation fluid in the conduit; and

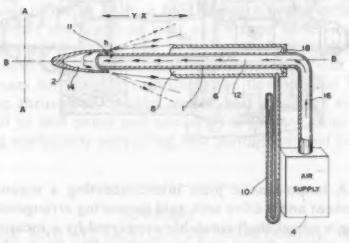
h. closing the valve means in the conduit to close the conduit to the fluid flow therethrough.

3,969,938

APPARATUS FOR MEASURING THE VELOCITY AND/OR DENSITY OF A FLUID STREAM

John W. Tanney, Ottawa, Canada, assignor to Canadian Patents and Development Limited, Ottawa, Canada

Filed Feb. 18, 1975, Ser. No. 550,560
Claims priority, application Canada, May 13, 1974, 199720
Int. Cl.² G01N *9/32*; G01F *1/00*
U.S. Cl. 73—189 **5 Claims**



1. Apparatus for measuring the velocity and/or density of a fluid stream comprising:
a. an elongated, fluid guiding member which is symmetrical in cross-section about at least one plane passing through and along a longitudinal axis of the elongated, fluid guiding member, with said longitudinal axis extending along a portion of the flow path of said fluid stream,
b. nozzle means spaced from said member to define at least one nozzle orifice therewith and for directing pressurized fluid in the direction of said longitudinal axis and along and in contact with at least, substantially identical opposing surface portions of said member on each side of said plane,
c. means for supplying said nozzle means with said pressurized fluid,
d. receiver means alongside the said substantially identical opposing surface portions and having at least one receiver mouth, in the path of said pressurized fluid from said nozzle means, to have fluid pressure imposed therein

from said fluid directed along said opposing surface portions from said nozzle means, and

e. indicating means connected to said receiver means for indicating, in terms of the fluid pressure therein, the velocity and/or density of said fluid stream, and wherein

f. the nozzle means has a nozzle orifice where geometry is such that the Reynolds number at the nozzle orifice is greater than 2,300 as defined in consistent units by:

$$Re = h\rho V/\mu$$

where

Re = dimensionless Reynolds number

h = the mean height of the nozzle orifice normal to the surface of the fluid guiding number

ρ = the density of the pressurized fluid supplied to the nozzle means when the apparatus is in use,

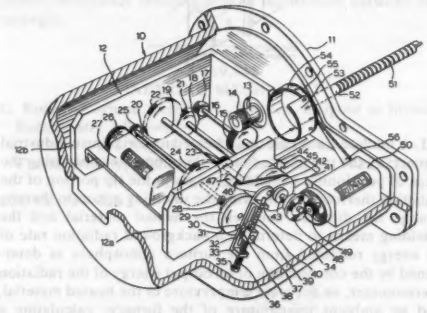
V = the mean velocity of the pressurized fluid in the nozzle orifice when the apparatus is in use, and

μ = the viscosity of the pressurized fluid in the nozzle orifice when the apparatus is in use.

3,969,939
TEMPERATURE COMPENSATOR FOR GAS FLOW METER

Ignacy John Grzeslo, 97 Poynter Drive, Weston, Ontario, Canada (M9R 1L6)

Filed Apr. 28, 1975, Ser. No. 572,172
Claims priority, application Canada, Mar. 20, 1975, 222660
Int. Cl.² G01F *15/04*
U.S. Cl. 73—194 M **7 Claims**



1. A temperature compensating device for use with a fluid flow meter, said device comprising:

a driving element adapted to be driven by fluid flowing through the meter;

first fluid volume recording means drivingly connected with said driving element to record fluid volumes flowing through the meter;

temperature sensing means adapted to contact the fluid flowing through the meter;

a cam surface bearing element connected to said temperature sensing means, the position of said cam surface being determined by the temperature sensed by the temperature sensing means;

an oscillatable cam striker element adapted to oscillate through an arc of travel defined at the first extremity by contact with said cam surface and at the second extremity by pre-set limiting means;

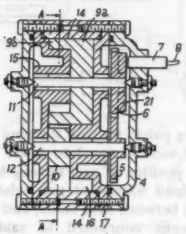
driven means which drives the cam striker element for oscillation in both directions, into and out of contact with the cam surface, the driven means comprising an eccentric driven by the driving element, and a lever connected to the eccentric by a pin and slot connection and pivotally connected with the cam striker element to cause oscillation thereof as said eccentric is driven, said pin and slot connection providing lost motion to permit continued drive of said eccentric when oscillation of the cam striker element is limited by contact thereof with the cam surface;

second fluid volume recording means drivingly connected with the cam striker element and responsive to the length of the arc of travel of the cam striker element.

3,969,940
FLUID FLOW METER

Alan George Butcher, Wokingham, England, assignor to Dresser Europe, S.A., Brussels, Belgium

Filed Dec. 11, 1974, Ser. No. 531,746
Claims priority, application United Kingdom, Dec. 11, 1973, 57435/73
Int. Cl.² G01F *3/08*
U.S. Cl. 73—253 **4 Claims**



1. A fluid flow metering device comprising:

a housing, said housing having an inlet port, and an outlet port, and a plurality of annular passages coupling said inlet and outlet ports;

a plurality of rotor means rotatably fitted in said annular passageway for rotating as fluid flows through said passageways from said inlet to said outlet, each rotor means being comprised of:

a rotor body rotatably fitted in said annular passageways, said rotor body having at least one blade portion depending therefrom fitting in one of said annular passages in a sealing relationship therewith, so that the fluid passing between the inlet and outlet ports through the passageway causes the rotor body to rotate by forcing against said blade portion, said rotor body further having at least one longitudinal pocket therein accommodating a blade portion of another rotor body in said passageways as the blade portion of the other rotor body rotates from the outlet to the inlet, said pocket forming a liquid seal for said blade portions; and

gear means coupled to said rotor means for causing said plurality of rotor means to rotate together in opposite directions.

3,969,941
LEVEL DETECTOR FOR LIQUIDS AND OTHER FLOWABLE MASSES

Eugen Rapp, Moordeich, Germany, assignor to E. Rapp Electronik GmbH, Moordeich, Germany

Filed Nov. 8, 1973, Ser. No. 413,788
Int. Cl.² G01F *23/00, 23/10;* H02P *8/00*
U.S. Cl. 73—290 R **14 Claims**

1. A level detector for a flowable mass, comprising:

a vessel containing a flowable mass whose level is to be determined;

reversible hoist means above said mass including a flexible link depending into said vessel;

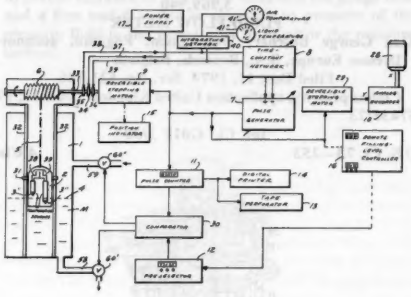
a sensing head suspended from said link within said vessel;

signal-generating means controlled by said sensing head for emitting a first signal upon the level of said mass relative

to said head lying above a predetermined upper limit and for emitting a second signal upon said relative level lying beneath a predetermined lower limit;

a reversible stepping motor for driving said hoist means;

pulse-generating means connected to said signal-generating means for emitting a train of forward-stepping pulses for said stepping motor in the presence of said first signal to raise said sensing head and for emitting a train of back-



ward-stepping pulses for said stepping motor in the presence of said second signal to lower said sensing head whereby the position of said sensing head is adjusted by a predetermined increment per pulse to maintain said relative level between said limits; and

monitoring means connected to said pulse-generating means in parallel with said stepping motor for determining the current position of said sensing head in response to said forward-stepping and backward-stepping pulses.

3,969,942

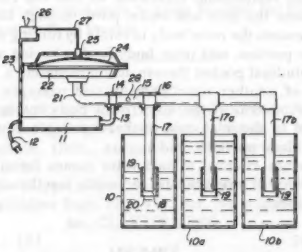
LIQUID LEVEL RESPONSIVE APPARATUS

Henry F. Hope, 3192 Huntingdon Road, Huntingdon Valley, Pa. 19006, and Stephen F. Hope, 2548 Wyandotte Road, Willow Grove, Pa. 19090

Filed Aug. 11, 1975, Ser. No. 603,779

Int. Cl.² G01F *23/16*

U.S. Cl. 73—302 **8 Claims**



1. Liquid level responsive apparatus comprising

a source of gas under pressure,

a probe tube connected to said source and immersed in the liquid whose level is to be measured and having a lower terminal end exposed upon fall of the liquid level therebelow,

a pressure responsive member connected to said probe tube and having a normal position responsive to said gas under pressure,

said tube having vent means for normal discharge of gas from said source,

said probe tube upon exposure of said terminal end discharging the gas in said tube whereby pressure responsive member is movable to a different position, and

a control member responsive to the positioning of said pressure responsive member.

3,969,943

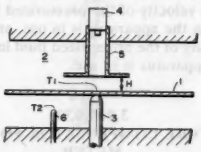
METHOD OF MEASURING THE TEMPERATURE OF FURNACE HOT STOCK AND APPARATUS THEREFOR

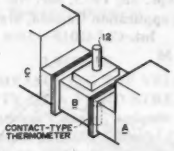
Jiro Ohno, Kawasaki; Tohru Iuchi, Tokyo; Yasuo Tokita, Kitakyushu; Hisanori Karasima, Kitakyushu; Kunitoshi Watanabe, Kitakyushu, and Seiichhiro Murashima, Ikuhashi, all of Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed Mar. 6, 1974, Ser. No. 448,457

Int. Cl.² G01J *5/06*

U.S. Cl. 73—355 EM **16 Claims**





1. A method for measuring a heated material in an industrial furnace by the use of a radiation thermometer comprising the steps of positioning a shielding means at the tip portion of the radiation thermometer; moving the shielding means to thereby change the distance between the heated material and the shielding means to determine a background radiation rate of an energy reflected from the furnace atmosphere as determined by the combination of an output energy of the radiation thermometer, an accurate temperature of the heated material, and an ambient temperature of the furnace; calculating a temperature error at arbitrary distances on the basis of said background radiation rate; setting the shielding means of the radiation thermometer in a position at which the temperature error is within a tolerable range; and measuring the heated material with use of the radiation thermometer.

3,969,944

SENSOR FOR ACCELEROMETERS

Gianfranco Cirri, Florence, Italy, assignor to Fabbrica Italiana Magneti Marelli, S.p.A., Milan, Italy

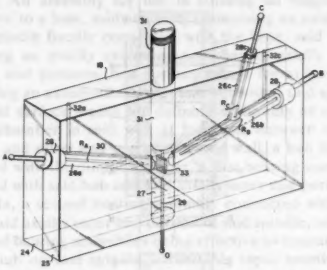
Filed Dec. 26, 1973, Ser. No. 431,070

Int. Cl.² G01P *15/12*

U.S. Cl. 73—516 LM **2 Claims**

1. An accelerometer sensor comprising: an electrically insulating body having a bottom portion and a top portion; said body being provided with at least two internally located tubular passages extending between said bottom portion of said body and said top portion, at said bottom portion of said body, the two said passages are intercommunicating and a chamber also being formed near said bottom portion of said body in which said passages intercommunicate; an electric resistor located in each of said passages and each said resistor having an upper end projecting from said insulating body; an electrical conductor sealingly passing from an outer end out-

side said body through said bottom portion of said body and terminating in said chamber, said upper ends of said resistors and said outer end of said conductor being connectable to an electrical circuit for detecting the resistance unbalances in said resistors; a conductive liquid completely filling said chamber and partially filling said passages, so as to assure for each rate of the acceleration within the measurement range that, due to acceleration, said conductive liquid will assume different levels in said passages, involving different portions of said



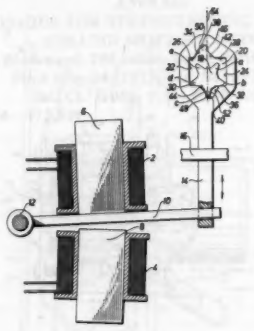
resistors and thereby causing the resistance unbalance which is used for measuring said acceleration; a piston vertically sliding within said connection chamber for adjusting the liquid level; to dampen the fluctuations of the conductive liquid from one said passage to another, there is a level adjusting piston carrying a flag and said flag being located in said chamber, said flag, depending on its angular position controlled by said piston, selectively resists the flow oscillations between said passages.

3,969,945

INDEXING MECHANISM

G. Roland Englund, Stockholm, Sweden, assignor to Svenska Dataregister AB, Sweden

Filed Aug. 5, 1974, Ser. No. 494,477
Claims priority, application Sweden, Oct. 3, 1973, 7313468
Int. Cl.² F16H *27/02*
U.S. Cl. 74—128 **8 Claims**



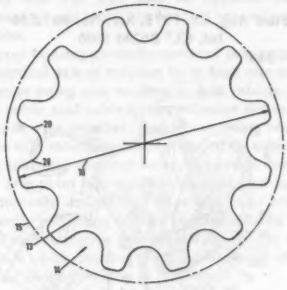
1. An indexing mechanism comprising:
an indexing wheel having at least three cogs;
an indexing arm movable by an actuator device between two limit positions;
said indexing arm at least partially enclosing said indexing wheel and being provided with first and second recess means;
each of said recess means including a first surface for coacting with a first cog whenever said indexing arm is moved from a first limit position to a second limit position to thereby move said indexing wheel through a predetermined angle;
each of said recess means further including second and third surfaces adapted for engaging, respectively, a portion of said first cog and a portion of the next-adjacent cog when said indexing arm is in a limit position.

3,969,946

CIRCULAR SIDE POSITIVE DRIVE BELT TEETH

Michael J. W. Gregg, Antrim, Northern Ireland, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Continuation of Ser. No. 485,642, July 3, 1974, Pat. No. 3,924,481. This application Oct. 14, 1975, Ser. No. 622,307
Int. Cl.² F16H *55/36;* **F16G** *1/28, 55/30*
U.S. Cl. 74—230.5 **2 Claims**



1. A pulley for use with a belt in a synchronous drive wherein the belt has a plurality of uniformly spaced, substantially identical teeth of a width W, said pulley having a plurality of substantially identical belt engaging teeth to mate with said belt teeth and defining a pulley cavity between each adjacent pair of teeth with each cavity having substantially identical fore and aft surfaces, at least part of which surfaces are shaped in cross-section as the arc of a circle of radius W + CA where CA is one-half the desired belt tooth: pulley cavity clearance; both said arcs being centered on the pitch circle at centers spaced at a distance W apart, the pitch circle diameter being the outer diameter of the pulley teeth plus twice the distance between the pulley surface of the belt between the teeth and the belt pitch line.

3,969,947

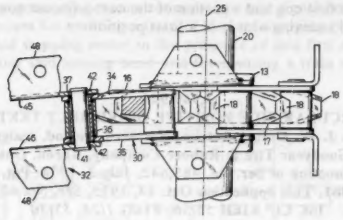
TAPERED TOOTH SPROCKET

Virgil B. Martin, West Bend, and Roger L. Villers, Fredonia, both of Wis., assignors to Gehl Company, West Bend, Wis.

Filed May 22, 1975, Ser. No. 580,027
Int. Cl.² F16H *55/30*
U.S. Cl. 74—243 R **10 Claims**

1. In a sprocket rotatable in at least one direction about an axis: a plurality of teeth radially extending in a plane normal to said axis, each tooth having an upper side and a lower side, at least some of said teeth each having on the upper side

thereof a surface level with said plane located near the tooth root and a portion contiguous with said surface which slopes



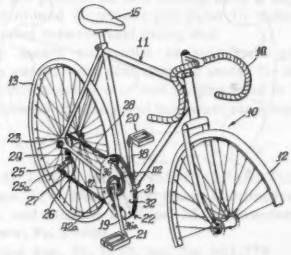
downwardly away from the center of said sprocket and downwardly in said one direction.

3,969,948

AUTOMATIC BICYCLE TRANSMISSION

Charles A. Pipenhagen, Jr., 835 Butternut Court, Roselle, Ill. 60172

Filed Aug. 25, 1975, Ser. No. 667,556
Int. Cl.² B62M 9/06
U.S. Cl. 74—244 **15 Claims**



1. A chain carrying sprocket of automatically varying diameter comprising a supporting plate, a plurality of relatively short identical arms pivotally mounted on said supporting plate, the pivot mountings of said arms defining a circle on said supporting plate, a small sprocket carried on each of said arms, a one-way clutch interposed between each of said small sprockets and said identical arms to permit rotation of said small sprockets in only one direction, a link member pivotally mounted at a position spaced from said small sprocket on each of said arms, means joining said link members, and spring means joining said supporting plate to said means joining said link members and arranged and constructed so that resistance to turning said supporting plate causes said small sprockets to uniformly swing radially inwardly on their identical arms.

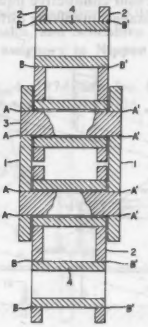
3,969,949

FILLERLESS WELDED CHAIN

Tatsuo Ohnishi, Kishiwada, Japan, assignor to Tsubakimoto Chain Co., Osaka, Japan

Continuation-in-part of Ser. No. 353,794, April 23, 1973, abandoned. This application Apr. 18, 1975, Ser. No. 569,454
Claims priority, application Japan, May 1, 1972, 47-42580
Int. Cl.² B21L 9/08; F16G 13/02; B21L 9/00
U.S. Cl. 74—255 R **6 Claims**

1. A roller chain comprising a series of inner links each comprising a pair of parallel inner link plates having opposed openings adjacent the opposite ends thereof and a pair of hollow bushes respectively extending into and between said opposed openings for securing said inner link plates together, said inner links being connected together by a series of outer links each comprising a pair of parallel outer link plates having opposed openings adjacent the opposite ends thereof and a pair of pins extending into and between said opposed openings for securing said outer link plates together, said pins on a given outer link extending through the bushes on the adjacent ends of two inner links to connect same together, the improvement wherein said bushes extend completely through the associated openings in said inner link plates, both ends of each



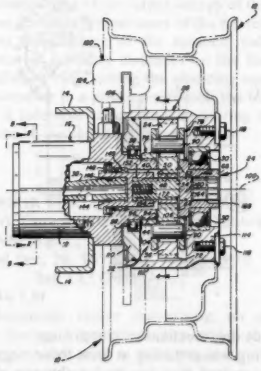
of said bushes terminating substantially flush with the outer surfaces of the associated inner link plates, and both ends of each of said bushes being fused in the associated openings of the inner link plates by a fillerless fusion welded connection which extends through the entire thickness of the inner link plates so that the entire circumference of the end portions of the bushes as disposed in the opposed openings are fixedly and integrally united to their associated inner link plates.

3,969,950

DRIVE ASSEMBLY

Jim Lee Rau, Lafayette, and Hollis Newcomb White, Jr., West Lafayette, both of Ind., assignors to TRW Inc., Cleveland, Ohio

Filed Mar. 4, 1974, Ser. No. 448,057
Int. Cl.² F16H 35/00, 1/28; F16D 13/44; B60K 3/00
U.S. Cl. 74—391 **17 Claims**



1. An assembly for use in rotating an output member relative to a base, said assembly comprising an axially extending spindle fixedly connected with the base, a rotatable hub fixedly connected with the output member, a first bearing assembly disposed between and connected with axially inner

portions of said spindle and said hub, a second bearing assembly disposed between and connected with axially outer portions of said spindle and said hub, said hub being rotatably supported on said spindle by said first and second bearing assemblies, a rotatable input member, motor means for rotating said input member, and gear means disposed between said first and second bearing assemblies and connected with said input member and said hub for rotating said hub at a rotational speed which is different than the rotational speed of said input member.

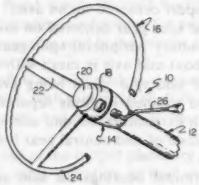
17. An assembly for use in rotating an output member relative to a base, said assembly comprising an axially extending spindle fixedly connected with the base, said spindle including an axially extending wall having axially inner and outer end portions, first surface means for at least partially defining an axially extending chamber within said spindle, and second surface means for defining a plurality of openings to said chamber in said wall at locations between said axially inner and outer end portions of said wall, a hub fixedly connected with the output member, a first bearing assembly connected with said hub and said axially inner end portion of said spindle, a second bearing assembly connected with said hub and said axially outer end portion of said spindle, said first and second bearing assemblies being effective to rotatably support said hub on said spindle, a rotatable input member at least partially disposed within said chamber in said spindle, motor means disposed in a coaxial relationship with said spindle for rotating said input member about a central axis of said spindle, and gear means disposed between said first and second bearing assemblies and connected with said input member and said hub for rotating said hub at a rotational speed which is different than the roational speed of said input member upon rotation of said input member, said gear means including a sun gear disposed in said chamber in said spindle and rotatable about the central axis of spindle under the influence of forces transmitted to said sun gear by said input member upon operation of said motor means, a plurality of idler gears extending through said openings in said wall of said spindle into meshing engagement with said sun gear, means for supporting said idler gears for rotation about a plurality of spaced apart parallel axes disposed outside said chamber and extending parallel to the central axis of said spindle, and a ring gear connected with said output member and disposed in meshing engagement with said idler gears.

3,969,951

TECHNIQUE FOR STRENGTHENING STEERING COLUMN SHIFT SOCKETS

Everett E. Blackwood, 205 Sabine Drive, Portland, Tex. 78374

Filed May 14, 1975, Ser. No. 577,154
Int. Cl.² G05G 9/12; B23P 7/04
U.S. Cl. 74—473 SW **16 Claims**



9. A steering column comprising

a repaired shift socket having an amputated pin retaining boss;

a sleeve, secured about the boss, having a shift lever connecting section disposed beyond the end of the amputated boss;

a shift lever disposed through the sleeve in the boss; and

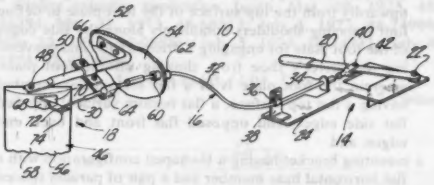
eans connecting the shift lever to the connecting section.

3,969,952

MIRROR ACTUATOR

Clyde M. McKee, 22175 Bernard St., Taylor, Mich. 48180, and Ward Scott, 429 Rochdale Drive, Rochester, Mich. 48063

Filed Nov. 25, 1974, Ser. No. 526,794
Int. Cl.² G05G 1/00
U.S. Cl. 74—501 M **3 Claims**



1. A mirror actuator for use in conjunction with an exteriorly mounted right hand rear view mirror on a vehicle, said mirror having a housing, said actuator comprising:

a lever assembly having a mounting bracket for securing said lever assembly to said vehicle and an elongated lever having one end free and its opposite end pivotally mounted to said mounting bracket around a single axis of rotation;

said mirror housing pivotally mounted only around a generally vertical axis of rotation by at least one support strut, said strut being also secured to said vehicle; and

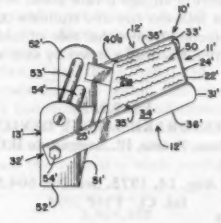
a single cable, said cable having an outer sleeve portion and an inner wire member, said sleeve being secured at one end to said mounting bracket and at its other end to said strut, said wire member being secured at one end to said lever at a point intermediate the free end and the pivotally mounted end of said lever and at its other end to a forwardly projecting second bracket secured to the housing of said mirror so that pivotal movement of said lever affects a corresponding pivotal movement of said mirror housing around its axis of rotation.

3,969,953

TRACTOR FOOT PEDAL GUIDE

Gerald E. Sponberg, Seaside, Oreg., assignor to Gerald E. Sponberg, Seaside, Oreg.

Filed Apr. 3, 1975, Ser. No. 564,760
Int. Cl.² G05G 1/14
U.S. Cl. 74—560 **1 Claim**



1. A tractor foot pedal guide for use in preventing a tractor driver's foot from slipping off a foot pedal during wet or muddy conditions, the foot pedal guide comprising:

a foot plate for engaging a portion of the tractor driver's shoe wherein side members are affixed to the foot plate to prevent the driver's shoe from inadvertently slipping out of contact therewith, with the foot pedal guide being further characterized by a rubber member affixed over the top surface of the foot plate, and a plurality of treads disposed above the top surface of the rubber member to

provide a better grip between the rubber member and the driver's shoe; and

said side members provided on the tractor foot pedal guide being identical to each other with each being manufactured of an elongated flat strap like member having a flat exterior surface, a flat interior surface, opposed end edges, and opposed side edges, the side edges of the foot plate being joined to the interior surfaces of the side members with a portion of the side members projecting upwardly from the top surface of the foot plate to define foot engaging shoulders completely along the side edges of the foot plate for engaging a driver's shoe and preventing the driver's shoe from slipping off the foot plate, wherein the foot plate is of a flat rectangular member having a flat top surface, a flat bottom surface, opposed flat side edges, and opposed flat front and back end edges; and

a mounting bracket having a U-shaped configuration with a flat horizontal base member and a pair of parallel spaced apart vertical side arms extending upwardly therefrom, a pair of vertically spaced apart horizontal parallel bolts extending between the side arms wherein one of the bolts extending between the side arms engages one of the end edges of each of the side members for pivotably retaining the side members to the mounting bracket for pivotal movement of the foot plate thereabout.

3,969,954

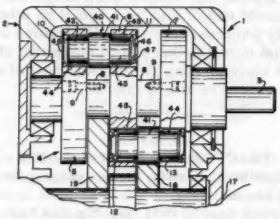
INDEX DRIVE SYSTEM CAM FOLLOWER ASSEMBLY

Wilfried E. Dehne, 14405 Lombard, Berwyn, Ill. 60402

Filed June 23, 1975, Ser. No. 589,039

Int. Cl.² F16H *53/06*

U.S. Cl. 74—569 **7 Claims**



1. In an index drive system wherein a cam follower is yoke mounted in a wheel to engage a cam plate, the improvement comprising a cam follower tire and trunions concentric with, fixed to, and projecting from either side of said tire and journalled in antifriction bearings carried by said wheel.

3,969,955

PRESS BRAKE SAFETY DEVICE

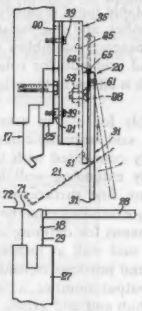
Robert D. Markham, Peoria, Ill., assignor to H C Products Co., Princeville, Ill.

Filed Aug. 14, 1975, Ser. No. 604,595

Int. Cl.² F16P *3/04*

U.S. Cl. 74—613 **4 Claims**

1. A safety device for precluding accidental operator invasion of the work zone between the die and anvil of a press brake or like machine, comprising: a horizontal elongated planar safety shield vertically movable with the ramhead of the press and mounted to depend beyond the lower edge of the ramhead between the operator and the work zone of the die and anvil, and mounting means supporting said shield on said ramhead including means providing limited vertical sliding movement thereof relative to said ramhead, and additional means providing pivotal movement thereof about a horizontal axis; whereby said shield is operational to move with and relative to the ramhead for engaging a workpiece and following upward movements thereof during forming operations and additionally is swingable away from the work zone for withdrawing a formed workpiece from the die zone.



3,969,956

TRANSMISSION FOR MULTISCREW EXTRUDER

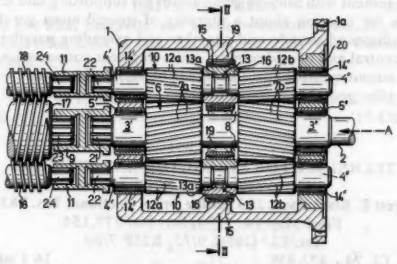
Wilhelm Hanslik, Linz, Austria, assignor to Krauss-Maffei Aktiengesellschaft, Munich, Germany

Filed Aug. 29, 1975, Ser. No. 609,062

Claims priority, application Germany, Aug. 31, 1974, 2441865

Int. Cl.² F16H *37/06, 1/18;* A01J *21/02*

U.S. Cl. 74—665 GD **10 Claims**



1. A transmission comprising:

a stationary support centered on an axis;

a unitary central spur gear centered on said axis;

a plurality of unitary peripheral spur gears symmetrically distributed about said axis in mesh with said central spur gear, each of said spur gears being provided with two axially spaced toothed sections separated by a median zone and with extremities beyond said toothed sections, the mediam zone of said central gear forming an annular gorge;

two sets of terminal bearings on said support receiving respective extremities of said central and peripheral spur gears; and

a set of intermediate journal bearings on said support each receiving said median zone of a respective peripheral spur gear, said intermediate journal bearings having undivided inner and outer races large enough to slip over the toothed sections of said peripheral spur gears, parts of said intermediate journal bearings extending into said gorge.

3,969,957

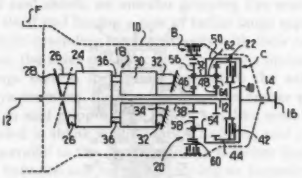
SYNCHRONOUSLY SHIFTABLE DUAL RANGE PLANETARY TRANSMISSION WITH COAXIAL INPUT SHAFTS

George M. DeLalio, 81 Gazza Blvd., Farmingdale, N.Y. 11735

Division of Ser. No. 317,528, Dec. 22, 1972, Pat. No. 3,855,879. This application Sept. 16, 1974, Ser. No. 506,593

Int. Cl.² F16H 47/04, 37/06, 57/10

U.S. Cl. 74—687 36 Claims



1. In a drive train of the type including power input means; an output shaft; hydrostatic transmission means comprising a driving member connected to said power input means, a driven member and means for effecting relatively reverse directions of rotation of said driven member; output planetary gearing including a plurality of drivingly interconnected members for selectively imparting low/reverse speed drive and high speed drive to said output shaft, one of said members of the output planetary gearing being connected to said driven member, said output shaft being drivingly connected with a second of said members of the output planetary gearing, a third one of said members of said output planetary gearing being adapted for selective connection to said power input means for drive input rotation thereby at a fixed ratio with respect to the rotation of said driving member, and a fourth one of said members of the output planetary gearing being adapted for selective braking to prevent its rotation; and input shaft and clutch means connecting said power means to said third member of the output planetary gearing; fixed means; brake means connecting said fixed means to said fourth member of the output planetary gearing; and means for engaging said clutch means while disengaging said brake means and vice versa; the improvement wherein:

said output shaft is coaxial with said input shaft and a quill shaft concentric with said input shaft connects said driven member to said one member of the output planetary gearing; and

said third member of the output planetary gearing being idly driven in the same direction as said output shaft and at said fixed ratio with respect to said driving member when said fourth member is fixed and said driven member attains a first maximum rotational speed with respect to said driving member whereby said clutch means may be engaged under synchronous conditions, and said one member of the output planetary gearing being driven from said first maximum speed to a second maximum speed which is of opposite rotational sense when said clutch means is engaged whereby progressively to increase the speed of said output shaft with respect to that of said power input means to a selected final ratio.

3,969,958

OUTPUT SPLIT TYPE HYDROSTATIC TRANSMISSION

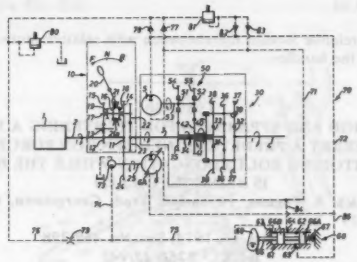
Takayuki Miyao; Hiroaki Maeda, both of Toyota; Masanori Sato, Nagoya, and Toshimitsu Sakai, Toyota, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya and Jidosha Kogyo Kabushiki Kaisha, Toyota, both of, Japan

Filed Mar. 25, 1974, Ser. No. 454,583

Claims priority, application Japan, Mar. 28, 1973, 48-35294; May 31, 1973, 48-60313; July 4, 1973, 48-74900; May 23, 1973, 48-56881; July 3, 1973, 48-74411; July 4, 1973, 48-76000

Int. Cl.² F16H 47/04, 37/06

U.S. Cl. 74—687 17 Claims



1. A steplessly adjustable hydrostatic-mechanical compound transmission, comprising:

an input drive shaft;

a four-shaft drive system disposed upon the output side of said transmission, one of said four shafts being the output drive shaft, and the other three of said four shafts being mechanically and hydrostatically driven by means of said input drive shaft and mechanically connected to said output drive shaft for driving the same;

a hydrostatic speed differential drive means including a first, non-adjustable positive displacement pump-motor, and a second positive displacement pump-motor driven by means of said input shaft and adjustable in both directions of pumping and which is disposed, along with said first pump-motor, in a closed hydraulic circuit serving as hydraulic communication means between said two pump-motors;

a drive power train selector means including a two-speed reversing drive means, having two operative mode positions and a neutral position, interposed between and connecting said input drive shaft with one of said three shafts, said first displacement pump-motor being connected, through means of a hydraulic coupling drive, with the other two of said three shafts; and

operating means disposed within said selector means and operatively connected with an adjustment means of said second adjustable pump-motor for facilitating synchronization of the movement of said reversing drive means between said two operative mode positions.

3,969,959

ADJUSTING TOOL FOR SURGICAL BLADE GUARD

John R. Beaver, 21 Lincoln St., Lexington, Mass. 02173

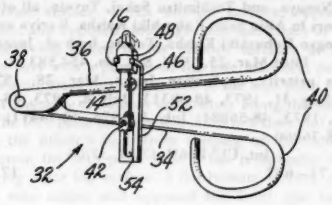
Division of Ser. No. 507,079, Sept. 18, 1974, which is a continuation of Ser. No. 332,611, Feb. 15, 1973, abandoned. This application Mar. 10, 1975, Ser. No. 556,814

Int. Cl.² B25B 27/00

U.S. Cl. 81—3 R 4 Claims

1. A tool for receiving an elongated blade having a movable guard frictionally positioned thereon to adjust the position of the guard on the blade, comprising a pair of members pivoted at one end so as to be movable in a plane towad and away from each other and having handles at the other end, and means projecting from the members between the pivot and the han-

dles in a direction perpendicular to the plane of movement for supporting and engaging the blade and guard assembly to



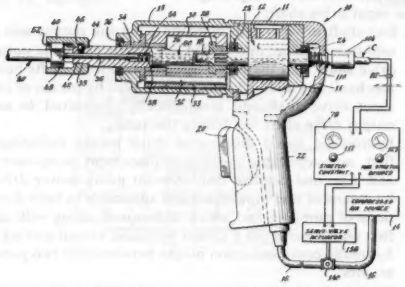
cause relative motion therebetween with relative motion between the handles.

3,969,960

METHOD AND APPARATUS FOR TIGHTENING A BOLT TO EXERT A PREDETERMINED TENSION FORCE BY MONITORING BOLT ELONGATION WHILE THE BOLT IS BEING INSTALLED

Dominick A. Pagano, 10 Sasqua Trail, Georgetown, Conn. 06829

Filed May 13, 1974, Ser. No. 469,298
Int. Cl.² B25B *23/142*
U.S. Cl. 81—52.4 R **19 Claims**



1. Torque wrench apparatus for tightening a bolt to exert a predetermined tension force by monitoring bolt elongation while the bolt is being installed comprising:

drive means adapted to engage the head of the bolt;

a main shaft equipped to carry said drive means on one end and having an axial bore therethrough;

means, coupled to said main shaft, for rotating said main shaft and said drive means to thereby rotate and tighten said bolt;

a rod mounted in said main shaft axial bore and movable axially with respect to said bore and projectable out of said main shaft axial bore at the end of said main shaft which is associated with said drive means; said rod being adapted to rotate with said main shaft;

an ultrasonic transducer, capable of generating and receiving ultrasonic energy, mounted on the projectable end of said rod and also associated with said drive means;

means for urging said end of said rod out of said main shaft axial bore and thus urging said ultrasonic transducer into contact with top surface of the head of the bolt when engaged by said drive means, said ultrasonic transducer and said rod being rotatable with the bolt when in contact therewith during bolt installation;

means for energizing said ultrasonic transducer to generate ultrasonic energy, for transmitting through the bolt from its head to its threaded end for being reflected from this end back to the bolt's head, finally to be received by said ultrasonic transducer; and

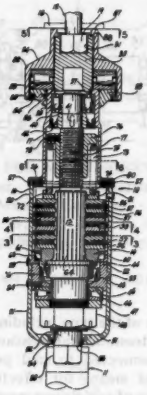
monitoring means coupled to said ultrasonic transducer for sensing the time required for the ultrasonic energy to be transmitted through the bolt to the bolt's threaded end and reflected back to the bolt's head to measure bolt elongation.

3,969,961

TORQUE LIMITING ADAPTOR

Michael J. Amoroso, Marion, Ill., assignor to M.A.T. Industries, Inc., West Frankfort, Ill.

Filed Dec. 9, 1974, Ser. No. 530,935
Int. Cl.² B25D *23/142*
U.S. Cl. 81—52.4 R **5 Claims**



1. An adaptor for limiting torque applied to a bolt by a wrench, the adaptor comprising:

a. a housing including engagement means at one end and an exterior abutment means,

b. an elongate shaft disposed coaxially within the housing and including engagement means at the end remote from said housing engagement means, one of said engagement means engaging the bolt and the other of said engagement means engaging the wrench, and

c. means mounting the shaft within the housing including:

1. journal bearing means between the shaft and the housing for relative rotation of said shaft and housing,

2. thrust bearing means between the shaft and the housing for transferring axial load from the shaft to the housing, and

3. clutch means between the shaft and the housing including first friction disc means keyed to the shaft and second friction disc means keyed to the housing, said first and second disc means being operatively pressure engageable to rotate the shaft and housing together when the torque applied to the bolt by the wrench, through the medium of the adaptor, is below a predetermined value,

4. said clutch means including pressure adjustment means carried by the shaft for selectively increasing the engagement pressure between the first and second friction disc means to predetermine the slippage point between said disc means, and

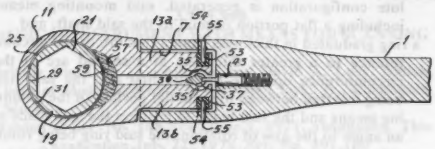
d. a second thrust bearing means seated on said abutment means and projecting axially beyond the housing end to transfer thrust to the mine roof by said projecting portion rather than by the relatively rotating housing engagement means.

3,969,962

FRICTION DRIVE WRENCH

Theodore A. Campbell, Paradise, Calif., assignor to C.M.T. Co., Paradise, Calif.

Filed May 27, 1975, Ser. No. 580,669
Int. Cl.² B25B 13/46
U.S. Cl. 81—60 7 Claims



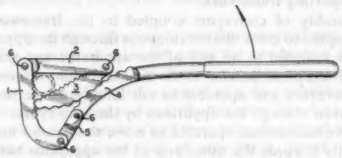
1. A wrench having an elongated shank, an axial cavity in one end of said shank, an annular gripping eye member split radially of itself and having a pair of radial tangs separated by the radial split extending into said cavity with their outer sides spaced from the sides of said cavity to permit limited tipping of said tangs therein in a plane normal to the axis of said gripping eye member, a cylindrical head member grippingly positioned in said gripping eye, and a key-like member rotatably journaled in shank wall structure defining said cavity and extending parallel to the axis of said eye member through said cavity and between said tangs and having an eccentric projection alternatively engageable with the opposing surfaces of one or the other of said tangs for biasing said tangs in selected directions circumferential of the axis of said gripping eye member in said cavity whereby movements of said shank in opposite directions causes tightening of said gripping eye member on said head member and back-up movements of said shank releases the grip of said gripping eye member on said head member.

3,969,963

ADJUSTABLE PIPE WRENCH

Bernard Roseby, 150 W. Edith Ave., No. 21, Los Altos, Calif. 94022

Filed Sept. 25, 1974, Ser. No. 509,015
Int. Cl.² B25B 13/50, 13/28
U.S. Cl. 81—66 A 1 Claim



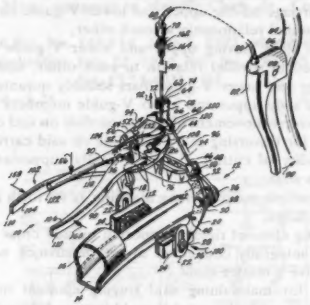
1. An adjustable wrench comprising an arcuate, elongated handle having a convex face with gear teeth thereon and a smooth concave face opposite the convex face, a swivel link pivotally connected to one end of the handle, a main link having one end curved and pivotally connected to said swivel link, the other end of said main link is pivotally connected to connecting link, said connecting link is pivotally connected, at the end opposite the end connected to the main link, to an anvil, said anvil having a work engaging straight surface with teeth, said teeth being inclined to grip the work in one direction and slip around the work in the other, and mating gear teeth on a curved surface of said anvil to mesh with said gear teeth on said elongated handle, said main link having oppositely inclined teeth on a work engaging surface thereof, said curved surface of said anvil being opposite the work engaging straight surface whereby force applied to said handle causes said gear teeth to mesh with said mating gear teeth and force said anvil to engage a workpiece, said main link having a bifurcated portion at said curved end to receive the end of said anvil opposite its pivotal connection to said connecting link thus allowing the said wrench to be used on a variety of different sizes of workpieces.

3,969,964

HAND TOOL FOR HOLDING AN ELONGATED MEMBER WHILE SIMULTANEOUSLY MOVING A SECOND MEMBER AXIALLY ALONG THE ELONGATED MEMBER

Douglas Franklin George, 324 Jefferson St., Bakersfield, Calif. 93305, and Wayne Lester Yowell, 3729 Ethyl St., Bakersfield, Calif. 93308

Filed Sept. 2, 1975, Ser. No. 609,585
Int. Cl.² B25B 7/02
U.S. Cl. 81—310 10 Claims



1. A hand tool for holding an elongated member while simultaneously moving a second member axially along said elongated member, comprising:

means for gripping said elongated member normal to its major axis;

means for engaging said second member and moving it along said elongated member; and

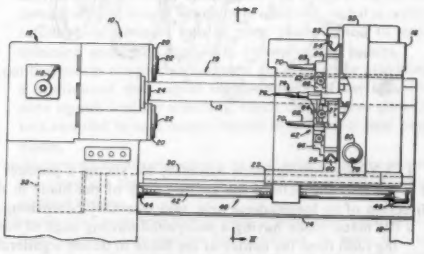
means connecting said second-mentioned means to said first-mentioned means for movement in a plane normal to the plane in which said first-mentioned means exerts its gripping force.

3,969,965

MULTIPLE MOLD FORMING MACHINE

Ernest C. Hawkins, Saginaw, Mich., assignor to Gateway Machine & Design, Inc., Saginaw, Mich.

Filed Jan. 29, 1974, Ser. No. 437,677
Int. Cl.² B23B 3/30, 3/28
U.S. Cl. 82—3 9 Claims



1. A multiple mold forming machine comprising, an elongated bed,

a longitudinal lower guide rail rigidly mounted on said bed,
a longitudinal upper guide rail rigidly mounted on said bed and laterally positioned above and in parallel relationship with said lower guide rail,
a headstock fixedly mounted on said bed for supporting a plurality of workpieces,
a carriage having a bottom portion and a side portion, said carriage bottom portion slidably mounted on said lower guide rail and said side portion slidably mounted on said upper guide rail for longitudinal movement of said carriage relative to said bed toward and away from said headstock,
means for longitudinally moving said carriage toward and away from said headstock on said bed,
said upper and lower guide rails and said carriage positioned thereon arranged to provide an access opening between said carriage and said headstock to permit unobstructed access to said carriage and said headstock,
said carriage having upper and lower V-guide bars spaced in parallel relationship to each other,
a cross slide, having upper and lower V-guide members spaced in parallel relation to each other, said carriage upper and lower V-guide bars slidably mounted in said cross slide upper and lower V-guide members to permit transverse movement of said cross slide on said carriage,
means for traversing said cross slide on said carriage, and
a plurality of cutting elements rigidly supported by said cross slide.

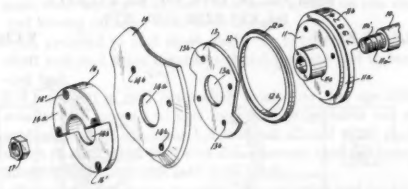
7. A multiple mold forming machine as set forth in claim 1 which includes,
a tracing element rigidly supported by said cross slide,
means integrally connected to said headstock adapted to receive a master mold,
means for maintaining said tracing element in abutting contact with the master mold retained in said master mold receiving means to permit each of said cutting elements to follow a cutting path on each of the workpieces which corresponds to the path followed by said tracing element on the master mold such that a plurality of molds are formed having a configuration identical to that of the master mold, and
means for adjusting the deflection of said tracing element from the surface of the master mold.

3,969,966

APPARATUS FOR SLICING MEAT PRODUCTS

Oscar W. Dillon, Essex, Conn., assignor to Cashin Systems Corporation, Williston Park, N.Y.

Filed June 9, 1975, Ser. No. 584,950
Int. Cl.² B26D *1/28, 1/56, 4/42*
U.S. Cl. 83—340 **2 Claims**



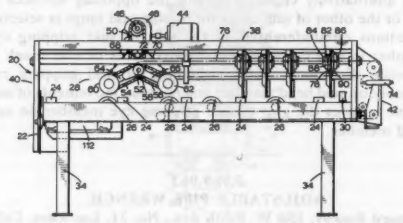
1. A rotary cutting blade assembly for slicing a product as it is fed into the path of the cutting edge of the blade in the direction of its longitudinal axis, said assembly comprising:
a flat metal blade having a sharpened cutting edge of varying radii from the center of the blade to define a generally involute configuration around the periphery thereof graduated between a first portion positioned relatively close to said center and a second portion spaced a greater distance from the said center so that when the product is fed into the blade as the blade is rotated a slice is cut for each rotation of the blade;
a shaft for rotating the said blade;
means to mount the said blade on the said shaft for rotation in a direction generally transverse of the path of the feed of the product, said mounting means being located adjacent the evolute center of the blade from which the involute configuration is generated, said mounting means including a flat portion normal to the said shaft; and
a ring graduated in thickness from a first arc of the circumference to a greater thickness at a second arc of the circumference opposite the said first arc, the said ring being inserted between the said flat portion of the mounting means and the said blade to position the said blade at an angle to the axis of rotation, the said ring being rotatable with respect to the blade whereby the said first arc can be adjusted to any desired radius of the blade.

3,969,967

WOOD TRIMMING MACHINE

Reggald E. Isley, 8504 100th A St., Grande Prairie, Alberta, Canada

Filed Oct. 16, 1975, Ser. No. 623,162
Claims priority, application Canada, Oct. 24, 1974, 212218
Int. Cl.² B27B *5/29*
U.S. Cl. 83—435.2 **5 Claims**



1. Apparatus for cutting unwanted end portions off lumber in the form of planks, studs and the like such that each of the remaining pieces of lumber is in one of several preferred lengths, the apparatus comprising:
a supporting framework;
a plurality of conveyors coupled to the framework and adapted to drive lumber sideways through the apparatus;
a saw coupled to an end of the apparatus and lying in a vertical plane parallel to the direction of movement of the conveyors and operable to cut lumber as the lumber is driven through the apparatus by the conveyors;
a drive mechanism operable to move the lumber longitudinally towards the other end of the apparatus before the lumber meets the saw; and
swinging stops coupled to the framework for arcuate movement in planes parallel to said plane containing the saw, the swinging stops being adjustable to change the spacings between the stops and the saw according to said required preferred lengths, each of the swinging stops comprising: a first portion extending generally downwardly and mounted adjacent its upper end for pivotal movement about a first axis in a respective one of said planes; a second portion pivotally connected to the first portion adjacent a lower end of the first portion on a second axis parallel to the first axis, said axes being such that with the stop in a rest position a line joining said axes defines an acute angle with the horizontal at a side of the first portion facing incoming lumber, the second portion lying generally horizontally to stop lumber moving longitudinally and having an overhanging inclined face for engagement by incoming lumber which is to pass under the stop whereby lumber engaging this face causes the stop to swing upwardly and to jack-knife as said acute

angle is reduced until the lumber passes under the stop in engagement with an underside of the second portion, and whereby as the lumber passes the second axis a turning moment is created in the second portion about the second axis to lower the second portion rapidly into a position for stopping lumber moving longitudinally in the apparatus.

3,969,968

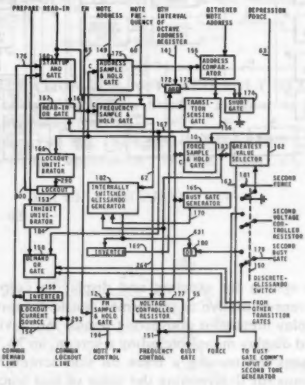
MUSICAL INSTRUMENT WITH MEANS FOR SCANNING KEYS

Melville Clark, Jr., Cochituate, and David A. Luce, Natick, both of Mass., assignors to Melville Clark, Jr., Cochituate, Mass.

Division of Ser. No. 148,514, June 1, 1971, abandoned. This application July 22, 1974, Ser. No. 491,160

Int. Cl.[2] G10H *1/00*

U.S. Cl. 84—1.01 **4 Claims**



1. Sound generating apparatus comprising,

output means,

a plurality of tone generators coupled to said output means for providing note signals with each including means for producing any of a large common plurality of frequencies characterizing respective musical notes over at least an octave,

a plurality of note selecting means for selecting note signals characteristic of selected notes for production by said tone generators where each note selecting means includes means upon selection for providing a note selection signal representing a unique contribution to a signal waveform on said output means which note selection signal is representative of at least one of note pitch, speed of note selction and force applied to note selecting means,

means coupled to each note selecting means for providing continuous data signals representative of the selected note signals and for selecting which of said tone generators coupled to said output means is to provide said note signals,

and scanning means responsive to said note selecting means for coupling the selected note selection signals to said control means,

said control means including means responsive to said note selecting means for providing a first number of control signals representative of selected notes and means responsive to said control signals for providing a second number less than said first number of time sequenced control signals,

and second means for coupling said time sequenced control signals to selected ones of said tone generators,

said scanning means further comprising a temporal sequencer having means for sequentially sampling the states of said note selecting means,

a note address generator having means for indicating the note status to be sensed,

a note-selected detector having means for indicating the state of selection of a note,

a note address tolerance generator having means for establishing a predetermined region of acceptable note addresses,

and gating means responsive to a signal from said note-selected detector indicating selection of a note,

wherein said gating means comprise means for separating signals representative of even ordered notes from signals representative of odd ordered notes.

3,969,969

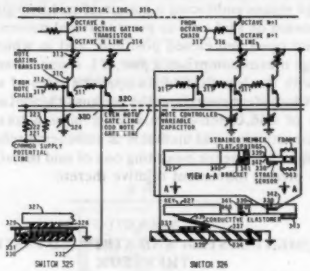
MUSICAL INSTRUMENT WITH MEANS FOR SCANNING KEYS

Melville Clark, Jr., Chochituate, and David A. Luce, Natick, both of Mass., assignors to Melville Clark, Jr., Cochituate, Mass.

Division of Ser. No. 148,514, June 1, 1971, abandoned. This application July 22, 1974, Ser. No. 490,385

Int. Cl.[2] G01H *1/02*

U.S. Cl. 84—1.26 **23 Claims**



1. Sound generating apparatus comprising,

output means,

a plurality of tone generators coupled to said output means for providing note signals with each including means for producing any of a large common plurality of frequencies characterizing respective musical notes over at least an octave,

a plurality of note selecting means for selecting note signals characteristic of selected notes for production by said tone generators where each note selecting means includes means upon selection for providing a note selection signal representing a unique contribution to a signal waveform on said output means which note selection signal is representative of at least one of note pitch, speed of note selection and force applied to note selecting means,

control means coupled to said tone generators for providing a continuous data signal representative of the selected note signals and for selecting which of said tone generators coupled to said output means is to provide said note signal,

and scanning means responsive to said note selecting means for coupling the selected note selection signals to said control means,

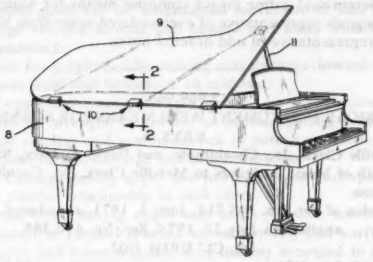
wherein said note selecting means comprises a plurality of force sensitive members for receiving at least one of vertical and horizontal forces and means associated with each such member for providing at least one of vertical and horizontal signals respectively representative of the vertical and horizontal forces applied thereto.

3,969,970

TRANSPARENT GRAND PIANO TOPS

Howard R. Swift, and Kenneth C. Livingston, both of Toledo, Ohio, assignors to Libbey-Owens-Ford Company, Toledo, Ohio

Filed Nov. 8, 1974, Ser. No. 522,239
Int. Cl.[2] G10C *3/02*
U.S. Cl. 84—177 6 Claims



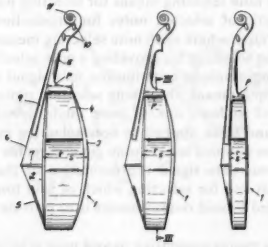
1. The combination, with a case for a grand piano that includes means for holding a cover therefor raised and in an open position; of a transparent cover shaped to fit said case, and hinge means embracing a margin of said transparent cover and mounted on said case to permit pivotal movement of said cover into open and closed positions; and in which a part of said hinge means comprises a pair of L shaped members positioned with the legs thereof on opposite sides of said margin of said transparent cover and the bottoms thereof overlapping an edge of said cover and in sliding relation to each other, means for retaining said members in embracing relationship to said margin, and means mounting one of said members on said case for pivotal movement relative thereto.

3,969,971

INSTRUMENT SYSTEM AND STRINGED-INSTRUMENTS THEREFOR

Ion Deiu, Bucharest-Mogosoaia, Romania, assignor to Complexul Pentru Prelucrarea Lemnului Reghin, Bucharest, Romania

Continuation-in-part of Ser. No. 70,130, Sept. 8, 1970, Pat. No. 3,691,891, and a continuation-in-part of Ser. No. 83,466, Oct. 23, 1970, Pat. No. 3,680,424. This application Feb. 18, 1972, Ser. No. 227,531
Int. Cl.[2] G10D *1/02*
U.S. Cl. 84—274 5 Claims



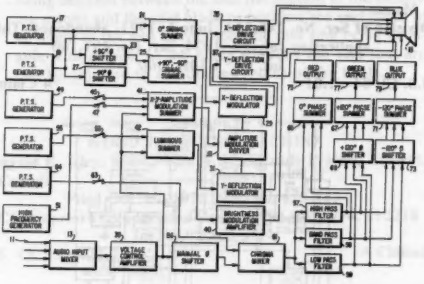
1. A musical-instrument system comprising at least four, stringed, violin-type, bow-operated instruments in ensemble and played da braccio all with identical overall length, notation clefs and substantially identical effective string length, said instruments having a common fingering and graduated body width with resonance shades corresponding at least to soprano, alto, tenor, and bass voices.

3,969,972

MUSIC ACTIVATED CHROMATIC ROULETTE GENERATOR

Robert L. Bryant, Box 6, Dry Fork, Va. 24549

Filed Apr. 2, 1975, Ser. No. 564,361
Int. Cl.[2] A63J *17/00*; H04M *1/00*
U.S. Cl. 84—464 11 Claims



1. A system for creating and displaying colored roulette curves representative of performed music comprising:

a display means for converting signals into a visual display, said display means including a screen, an X-,Y-deflection means for moving a trace on said screen, and a color means for determining the color of said trace; and

an X-,Y-deflection control means including a signal producing means for producing at least two synthetic musically-related signals having frequencies f_1 and f_2 in a ratio of integers one to the other, where said frequencies f_1 and f_2 are very nearly equal to the frequencies of notes in a standard music scale, modulation means for modulating each of said at least two synthetic signals by performed-music signals, and a means for applying said modulated signals to said X-,Y-deflection means to thereby produce roulette curves on said screen having elements related to the physical characteristics of said at least two synthetic signals as well as those of said performed-music signals; and

a music-signal processing means for receiving said performed-music signals and for further modifying the physical characteristics of said visual display in a manner responsive to the physical characteristics of said performed-music signals.

3,969,973

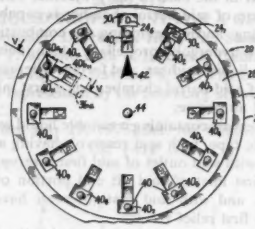
DEVICES FOR SELECTIVE DISPLAY OF INFORMATION

George Pandapas, Jr., 322 W. 72nd St., New York, N.Y. 10003

Filed June 16, 1975, Ser. No. 587,246
Int. Cl.[2] G09B *15/02*
U.S. Cl. 84—474 15 Claims

1. A musical information display device comprising a first member having a surface bearing spaced musical indicia, a second member overlying said first member surface and rotatable relative to said first member, said second member having apertures registrable with said first member indicia on such relative rotation of said first and second members and a closure element for each said aperture operable for opening the

same to provide display therethrough of the first member indicium registered therewith, each said closure element being



operable independently of operation of the others of such closure elements.

3,969,974

CONFIGURATION FOR NUTS AND BOLT HEADS

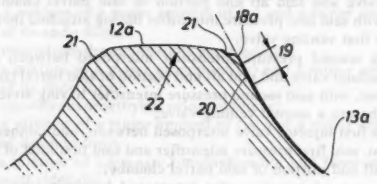
Sixten H. Lejdegård, Ramnas, Sweden, assignor to Bulten-Kanthal Aktiebolag, Sweden

Filed Feb. 26, 1974, Ser. No. 445,920

Claims priority, application Sweden, Feb. 27, 1973, 73027195

Int. Cl.² F16B *23/00, 35/00*

U.S. Cl. 85—45 6 Claims



1. A threaded metal fastener having an external rotational drive formation having a surface which, when viewed in plan, comprises an outer cylinder having a plurality of at least partially concave re-entrant surfaces of smaller radius of curvature than said outer cylinder and equiangularly spaced about its periphery, each of the regions of intersection of said re-entrant surfaces with said outer cylinder being planar and disposed at an angle on the order of 20° with respect to an immediately adjacent drive face portion of the re-entrant surface to provide a clearance for reception of any built-up metal.

3,969,975

HEAVY DUTY STAPLE

Harry J. Krol, Arlington Heights, Ill., assignor to King-Koral, Inc., Glenview, Ill.

Filed Apr. 28, 1975, Ser. No. 572,207

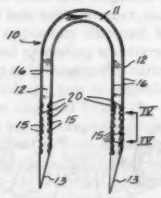
Int. Cl.² F16B *15/06*

U.S. Cl. 85—49 15 Claims

1. A staple having a head end and elongated spaced substantially coextensive prongs with pointed tips, the prongs being of generally square cross section each provided with four longitudinal corners:

a plurality of the corners on each of the prongs having respective series of longitudinally spaced interlock notches;

each of said notches being defined by a shoulder facing generally toward the head end of the staple and a surface slanting from the inner end of the shoulder and running out at the associated prong corner, the shoulders on said four corners being arranged so as to be in sets with each set disposed in a common plane extended transversely of a longitudinal axis through the associated prong and with the sets being arranged in a series of generally parallel planes extending along the length of the prong enabling each set of shoulders to be simultaneously embedded when the staple is driven into an object and with the



shoulders and the associated notches in each set being spaced from one another about a central axis of the associated prong;

said notches being coined, and with material displaced from the notches providing lateral shoulder bulges on the faces of the prongs alongside the notches thus increasing the effective areas of the shoulders.

3,969,976

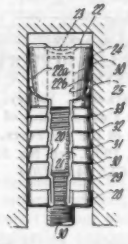
EXPANSION UNIT

Peter Amico, 4854 Glenfield Drive, Syracuse, N.Y. 13215

Filed Sept. 5, 1974, Ser. No. 503,352

Int. Cl.² F16B *13/04*

U.S. Cl. 85—75 5 Claims



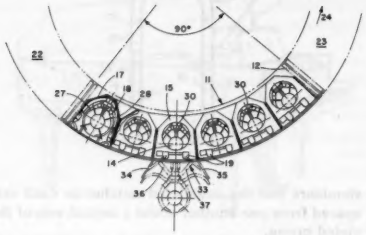
1. An expansion unit for mine roof bolts and the like comprising a generally cylindrical shell formed from sheet metal and wedging means for expanding said shell, wherein said shell comprises a pair of like opposed arcuate leaves connected at one end by a generally U-shaped strap; each of said leaves (i) being provided at its free end with an external cuff having a solid, continuous upper edge formed by an outward foldover of metal; (ii) having a relatively smooth internal surface so as to allow free downward travel of said wedge without binding; and (iii) having an external surface provided with a plurality of lateral and outwardy extending serrations or ridges defining circumferential arcs, said serrations or ridges being of gradually diminishing radial height from the cuff end to the connected end so as to provide said unit with an effective external taper prior to insertion of the unit in a mine roof hole or the like; wherein said cuff and said ridges are dimensioned to ensure that, upon said insertion, the outer surface of said cuff and said ridges simultaneously contact the inner wall of said hole to thereby increase the holding power of said unit, so that expansion of said unit occurs in a substantially parallel fashion alongsubstantially its entire length, and said unit maintains its generally cylindrical shape during said expansion. along substantially

3,969,977

HULL MODULE WEAPON OR EQUIPMENT SYSTEM

Everett W. Opdahl, Lutherville, and Chang K. Kim, Serverna Park, both of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 16, 1974, Ser. No. 461,466
Int. Cl.[2] F41F 3/10
U.S. Cl. 89—1.810 12 Claims



1. The combination with the double hulls of a submarine of exteriorly disposed launchable payloads comprising:

a unitary payload module including a plurality of individual capsules and a payload in each capsule,

said module occupying and secured in recesses between the double hulls of a submarine;

each of said capsules containing combined means for storing and deploying the payload therein; and

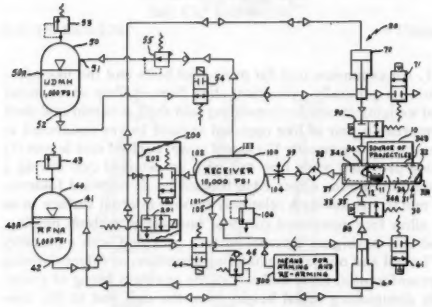
control means connecting said capsules to a central control in the submarine so that said payloads may be remotely and selectively deployed and launched.

3,969,978

DIRECT INJECTION LIQUID PROPELLANT GUN SYSTEM

Kerry D. Seifert, and Parker C. Smiley, both of Oakland, Calif., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Dec. 20, 1974, Ser. No. 535,339
Int. Cl.[2] F41F 1/04
U.S. Cl. 89—7 5 Claims



1. A direct injection liquid hypergolic bipropellant gun system, adapted for use as a rapid fire, small caliber, high muzzle velocity aircraft cannon system which is in combination with a source of small caliber projectiles suitable for use in the aircraft cannon system, wherein each of the said projectiles has a base at the rear thereof comprising:

a. at least one aircraft cannon, having a barrel of preselected finite length, with said barrel having a fore end with a muzzle thereat and an aft end with a chamber therein, with said chamber having a fore end portion with a closeable opening capable of receiving, accepting, and housing a projectile from the source of projectiles, and with said chamber also having an aft end portion located to the rear of the base of the projectile, wherein said aft end portion of said barrel chamber is capable of receiving, housing, and withstanding the combustion of a suitable liquid hypergolic propellant which includes a liquid fuel and a liquid oxidizer, and further wherein said aft end portion of said barrel chamber has a first inlet, a second inlet, and an orifice;

b. a first reservoir containing a suitable liquid oxidizer of the hypergolic type, with said reservoir having an outlet and an inlet, with said outlet of said first reservoir connected to said first inlet of said aft end portion of said barrel chamber, and with said first reservoir having attached thereto a first relief valve;

c. a second reservoir containing a suitable liquid fuel of the hypergolic type, with said reservoir having an outlet and an inlet, with said outlet connected to said second inlet of said aft end portion of said barrel chamber, and with said second reservoir having attached thereto a second relief valve;

d. a first valve interposed between, and connected to, said first reserovir and said aft end portion of said barrel chamber, with said first valve being of the shut-off type to control the flow of said liquid oxidizer;

e. a second valve interposed between, and connected to, said second reservoir and said aft end portion of said barrel chamber, with said second valve being of the shut-off type to control the flow of said liquid fuel.

f. a first pressure intensifier interposed between said first valve and said aft end portion of said barrel chamber, with said first pressure intensifier having attached thereto a first venting valve;

g. a second pressure intensifier interposed between said second valve and said aft end portion of said barrel chamber, with said second pressure intensifier having attached thereto a second venting valve;

h. a first injector valve interposed between, and connected to, said first pressure intensifier and said first inlet of said aft end portion of said barrel chamber;

i. a second injector valve interposed between, and connected to, said second pressure intensifier and said second inlet of said aft end portion of said barrel chamber;

j. a third reservoir having a first outlet, a second outlet, a third outlet, an orifice, and an inlet, with said third reservoir connected at said orifice to the said orifice at the said aft end portion of said barrel chamber to permit the inflow, the storage, and the outflow of said resultant combustion gases which flow out of said orifice at said aft end portion of said barrel chamber, and with said third reservoir connected at said first outlet to said inlet of said first reservoir containing said liquid oxidizer of the hyperbolic type, and with said third reservoir connected at said third outlet to said inlet of said second reservoir containing said liquid fuel of the hyperbolic type, and with said third reservoir having attached thereto a third relief valve;

k. a third valve interposed between, and connected to, said third reservoir and said first reservoir, with said third valve being of the pressure regulator type;

l. a fourth valve interposed between, and connected to, said third reservoir and said second reservoir, with said fourth valve being of the pressure regulator type;

m. a filter interposed between, and connected to, said orifice of said aft end portion of said barrel chamber and said third reservoir;

n. a fifth valve interposed between, and connected to, said filter and said orifice of said third reservoir, with said fifth valve being of the flow control type;

o. a sixth valve interposed between, and connected to, said second outlet of said third reservoir, and said first and said second pressure intensifiers, with said sixth valve being of the piezoelectric three-way type;

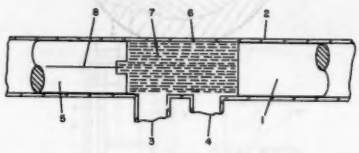
p. means for arming said liquid bipropellant gun system;
q. and, means for rearming said liquid bipropellant gun system.

3,969,979

LIQUID PROPELLANT FOR A GUN

Abraham Schneider, Overbrook Hills, Pa.; Stanley E. Wood, and James T. Bryant, both of Inyokern, Calif., assignors to Sun Ventures, Inc., St. Davids, Pa. and The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed July 29, 1975, Ser. No. 600,016
Int. Cl.² F41F *1/04*
U.S. Cl. 89—7 **3 Claims**



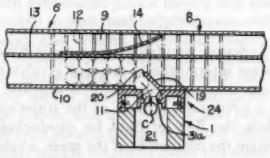
1. In a liquid propellant gun system wherein an emulsion of a liquid hydrocarbon and nitric acid is employed in the breech of a gun behind the projectile, the improvement comprises that the hydrocarbon is selected from the group consisting of
a. exo-tetrahydrodicyclopentadiene;
b. a mixture of a major amount of (*a*) and a minor amount of its endo form;
c. exo-tetrahydrodimethyldicyclopentadiene;
d. a mixture of a major amount of (*c*) and a minor amount of its endo form;
e. exo-tetrahydromethyldicyclopentadiene;
f. a mixture of a major amount of (*e*) and a minor amount of its endo form;
g. exo-tetrahydroethyldicyclopentadiene;
h. a mixture of a major amount of (*g*) and a minor amount of its endo form;
i. a mixture of trans-syn-2-methyldecalin and trans-anti-1-methyldecalin;
j. trans-perhydroacenaphthene;
k. perhydrofluorene; and
l. a mixture of any of the foregoing.

3,969,980

MACHINE GUN

Hubertus Brandstätter, and Oswald Tschöll, both of Kufstein, Austria, assignors to American International Corporation, Salt Lake City, Utah

Filed Apr. 12, 1974, Ser. No. 460,601
Int. Cl.² F41C *25/10*
U.S. Cl. 89—33 D **12 Claims**



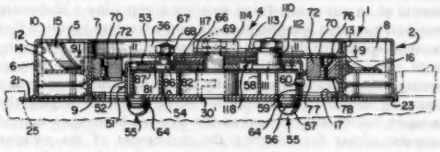
1. A machine gun for cartridges having rims with a diameter greater than the body of the cartridges including, a receiver having a reciprocating bolt and provided with an upwardly facing cartridge feeding access area adjacent the opening to the chamber of a barrel connected to said receiver, a feed block having a cartridge throat therethrough disposed within said access area and provided with a main body having at least a portion thereof straddling the top of said bolt when said bolt is in its forwardmost position of travel, a cartridge magazine mounted atop said gun and including a bottom facing cartridge exit overlying said feed block throat, drive means within said magazine sequentially urging cartridges under pressure through said exit to said feed block throat, fixed and displaceable stop means in said block bounding said throat for supporting in a forwardly downwardly inclined manner each cartridge being urged from said magazine exit for subsequent delivery by said bolt into said chamber, said fixed stop means including a pair of oppositely disposed ledges adjacent the rear of said throat and extending transversely into said throat to support there-atop only the rim of a cartridge, said displaceable stop means including a pair of oppositely disposed moveable flange members disposed below the plane of said fixed rim ledges each having an inwardly projecting lip normally extending only into the forward area of said throat, spring means constantly urging said lips into said throat and said spring means resists the pressure of said drive means and supports each cartridge in said inclined manner upon said lips until subsequent downward and forward delivery of said cartridge into said chamber by said bolt.

3,969,981

MACHINE GUN CARTRIDGE MAGAZINE

Hubertus Brandstätter, and Oswald Tschöll, both of Kufstein, Austria, assignors to American International Corporation, Salt Lake City, Utah

Filed Apr. 12, 1974, Ser. No. 460,602
Int. Cl.² F41C *25/10*
U.S. Cl. 89—33 D **22 Claims**



1. A drum cartridge magazine for a machine gun having a receiver mounting surface, including, a base plate adapted to overlie the gun receiver surface and having a cartridge exit therethrough for delivering cartridges to the gun receiver, means on said base plate for fixed attachment to said receiver mounting surface, a ring-shaped cover defining a storage cavity adapted to contain a plurality of cartridges overlying said base plate, means connecting said cover to said plate while permitting relative angular displacement therebetween, alignment means within said cover cavity maintaining cartridges therein in a plurality of adjacent vertically disposed columns, a drive assembly centrally disposed within the confines of said cover, means removably attaching said drive assembly to said base plate, said drive assembly including a base member fixedly attached relative said magazine base plate, a rotatable drive arm on said drive assembly provided with a distal portion engageable with said cover to angularly displace said cover relative to said magazine base plate and drive assembly base member and to sequentially advance cartridges therein to said plate exit, spring means within said drive assembly having opposite ends respectively fixed relative said drive assembly base member and drive arm to rotate said drive arm when said spring means is energized, and said drive assembly including brake means operable to immobilize said drive arm against rotary displacement when said spring means is energized whereby, said drive assembly may be removed from said magazine base plate without de-energizing said spring means when said brake means is operated.

3,969,982

APPARATUS FOR DAMPING THE FORWARD AND RETURN MOVEMENTS OF AN AUTOMATIC FIRING WEAPON

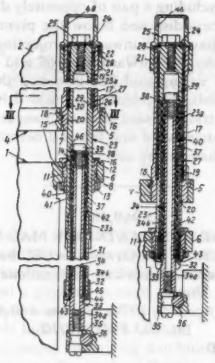
Jacques Pier-Amory, Chatelaine, and Beat Koch, Hunibach, both of Switzerland, assignors to Werkzeugmaschinenfabrik Oerlikon-Buhrle AG, Zurich, Switzerland

Filed Apr. 15, 1974, Ser. No. 461,119

Claims priority, application Switzerland, May 4, 1973, 6337/73

Int. Cl.² F41F *19/12*

U.S. Cl. 89—178 13 Claims



1. An apparatus for damping the forward and return movements of an automatic firing weapon comprising a stationary weapon mount, a weapon housing and a weapon barrel, a first annular spring for damping movement of the weapon housing with respect to the stationary weapon mount, said annular spring being arranged externally of the weapon housing in a damping mechanism, means for displaceably arranging the weapon barrel with respect to the weapon housing, a second annular spring for damping the movement of the weapon barrel with respect to the weapon housing, said second annular spring being arranged in said damping mechanism, said damping mechanism comprising a first sleeve member secured at the weapon housing substantially parallel to the weapon barrel, said sleeve member being supported via the first annular spring at the stationary weapon mount, the weapon barrel being supported at the sleeve member via the second annular spring, a further sleeve member, said two sleeve members being arranged parallel to and at both sides of the weapon barrel and provided at the weapon housing.

3,969,983

BREECHBLOCK FOR AUTOMATIC FIRING WEAPON

Jürg Zellweger, Neerach, and Max Fierz, Rumlang, both of Switzerland, assignors to Werkzeugmaschinenfabrik Oerlikon-Buhrle, Zurich, Switzerland

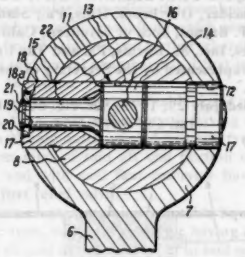
Filed Sept. 30, 1974, Ser. No. 510,913

Claims priority, application Switzerland, Oct. 3, 1973, 14151/73

Int. Cl.² F41D *3/06*

U.S. Cl. 89—185 3 Claims

1. A breechblock arrangement for an automatic firing weapon comprising a breechblock carrier, a substantially cylindrical breechblock body rotatably and axially displaceably mounted in said breechblock carrier, said breechblock body having a transversely extending bore, a control bolt arranged in said transversely extending bore of said breechblock body, said breechblock carrier being provided with control grooves, said control bolt having opposed ends, a sleeve surrounding each end of the control bolt, said sleeves being rotatably mounted in said bore of the breechblock body and engaging with the control grooves of the breechblock



carrier, and holding means fastened to the control bolt for securing the sleeves against axial displacement.

3,969,984

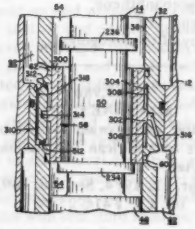
HYDROACOUSTIC APPARATUS AND VALVING MECHANISMS FOR USE THEREIN

John V. Bouyoucos, Rochester, N.Y., assignor to Hydroacoustics Inc., Rochester, N.Y.

Filed Nov. 11, 1974, Ser. No. 522,978

Int. Cl.² F01B *7/18*; F01L *17/02*

U.S. Cl. 91—276 26 Claims



1. For use in hydraulic oscillator apparatus in which a pressure actuated mass intermittently engages a valving element which is separate from said mass and is movable together therewith over a substantial portion of the trajectory of said mass to modulate the flow of fluid for producing pressure variations to sustain the oscillation of the mass, a valve mechanism which comprises means including said valving element for confining a volume of said fluid, and means for controlling the flow of said fluid into and out of said volume as a function of the position of said valving element as said element moves whereby to control the motion of said valving element and substantially eliminate any differences in the displacement of said mass and said element as they move together over said substantial portion of said trajectory.

3,969,985

FLUID ACTUATING DEVICE FOR AN ELECTRIC CIRCUIT BREAKER

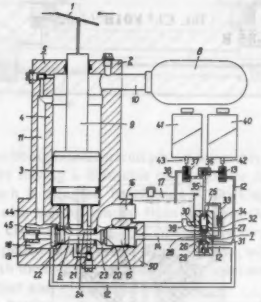
Gerhard Grieger, and Joaquin Bohrdt, both of Berlin, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed July 2, 1973, Ser. No. 375,746

Claims priority, application Germany, July 12, 1972, 2235074

Int. Cl.² F15B *13/043*, *15/17*; H01H *35/38*

U.S. Cl. 91—416 18 Claims



1. A fluid actuating device for an electric switching apparatus such as a high-voltage power circuit breaker or the like comprising an actuator for actuating the electric switching apparatus, said actuator including a cylinder and an actuator differential piston movable in said cylinder between first and second positions corresponding to the open and closed positions of the switching apparatus, said actuator differential piston having two end-faces for receiving fluid pressure force; high-pressure fluid supply means for supplying fluid under high-pressure to said end-faces; a main-valve arrangement including a main-valve differential piston movable between two end positions for alternately interrupting and connecting the fluid from said fluid supply means to one of said end-faces of said actuator differential piston whereby said actuator differential piston is caused to move between said first and second positions, said main-valve differential piston having two end-faces fluidly connected to said fluid supply means; and, a control valve arrangement including a control differential piston movable between two end positions for interrupting and connecting the fluid supply from said fluid supply means to one of said end-faces of said main-valve differential piston, said control differential piston having two end-faces also fluidly connected to said fluid supply means, and control means for actuating said control differential piston in response to inputs for opening and closing the switching apparatus by alternately interrupting and connecting the fluid from said fluid supply means to one of said end-faces of said control differential piston; said other one of said end-faces of each of said differential pistons being connected directly to said high-pressure fluid supply means to cause the same to be subjected continuously to the pressure of said fluid, said other one of said end-faces of each of said differential pistons being smaller than said one end-face thereof; said actuator differential piston, said main-valve differential piston and said control differential piston being actuable exclusively by the pressure of the fluid of said fluid supply means whereby said two end positions of each of said differential pistons are maintained independent of the instantaneous value of the pressure of the fluid.

3,969,986

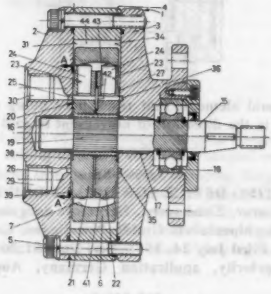
RADIAL PISTON PUMP

Carl Verner Ohrberg, Nordborg, Denmark, assignor to Danfoss A/S, Nordborg, Denmark

Continuation of Ser. No. 169,827, July 6, 1971, abandoned, which is a continuation of Ser. No. 877,363, Nov. 17, 1969, abandoned. This application Jan. 11, 1973, Ser. No. 322,883

Int. Cl.² F01B *13/06*

U.S. Cl. 91—492 8 Claims



1. A radial piston pump comprising a casing having a generally cylindrically shaped chamber with first and second walls having first and second spaced and parallel internal surfaces, one and only one of said walls having fluid feeding and exhausting passages which have direct fluid communication with the exterior of said casing, a shaft rotatably mounted in said casing, a pair of first and second generally cylindrically shaped piston carriers in said chamber, said carriers having adjacent and opposite surfaces, said carriers being attached to said shaft for rotation therewith and axial movement relative thereto, one of said carriers having a first set of fluid inlet and outlet passages extending transversely thereof, the other of said carriers having a second set of fluid inlet and outlet passages extending transversely thereof, said carriers being indexed relative to each other with said first set of passages in said one carrier being respectively aligned with and having fluid communication with said second set of passages in said other carrier, at least one of said adjacent surfaces having at least one recessed surface portion in surrounding relation to at least one of said passages and sealing means between said adjacent carrier surfaces in surrounding and radially spaced relation to the mouths of said passages, said sealing means including at least one sealing element in surrounding relation to said recessed surface portion, said recessed surface portion being exposed to pressurized fluid in at least one of said passages to force said carriers apart into sealing engagement with said first and second wall surfaces.

3,969,987

HYDROACOUSTIC APPARATUS AND VALVING MECHANISMS FOR USE THEREIN

Boyd A. Wise, Webster, N.Y., assignor to Hydroacoustics Inc., Rochester, N.Y.

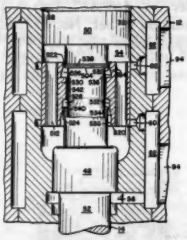
Filed Nov. 11, 1974, Ser. No. 522,824

Int. Cl.² F01L *25/04*; F01B *7/18*

U.S. Cl. 91—317 16 Claims

1. For use in a hydraulic oscillator having a housing, means for continuously introducing hydraulic fluid under pressure into said housing, a pressure actuated mass and a valving element which modulates the flow of the fluid to produce pressure variations for sustaining the oscillations of said mass, a mechanism for actuating said valving element which comprises means for maintaining said mass and said element out

of contact with and in close proximity to each other to define a plurality of fluid resistances therebetween for coupling said



mass and said element, said resistances being spaced from each other in the direction of movement of said mass.

3,969,988

ARRESTING DEVICE FOR IMPACT DRIVE TOOLS

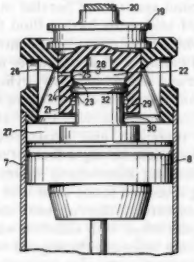
Werner Maurer, Zizishausen, Germany, assignor to Karl M. Reich Maschinenfabrik GmbH, Nuertingen, Germany

Filed July 24, 1974, Ser. No. 491,265

Claims priority, application Germany, Aug. 2, 1973, 2339162

Int. Cl.[2] F15B 15/26

U.S. Cl. 92—19 5 Claims



1. In an impact tool having a cylinder with a longitudinal axis, a percussive piston movable in the cylinder, pressure medium supply means secured to one end of the cylinder for applying pressure to one end of said piston to cause said piston to travel in an impact stroke, pressure storage means at another end of the cylinder for storing pressure medium during an impact stroke for returning the piston to a rest position at said one end of the cylinder following the impact stroke, and an arresting device including a stationary member at said one end of said cylinder and a locking shoulder at the upper end of said piston movable with the piston for holding the piston in said rest position in the absence of pressure for causing stroking of the piston and for releasing the piston upon the application of sufficient pressure medium to cause an impact stroke, the improvement wherein said stationary member of said arresting device comprises a rubber elastic sleeve including a plurality of rubber elastic arresting bulges inside said sleeve, each rubber elastic arresting bulge including a first ring surface slanted at a given angle relative to said longitudinal axis to flare outwardly and to face toward said percussive piston, and a second ring surface facing away from said percussive piston and forming an angle with said longitudinal axis, which is larger than said given angle, and means axially spacing said rubber elastic arresting bulges apart with respect to said longitudinal cylinder axis to form grooves inside said stationary rubber elastic arresting sleeve, said shoulder of said piston deflecting said bulges radially outwardly until the shoulder is locked by one of said bulges in any one of a plurality of positions in said cylinder during the return piston stroke, the locking position of said piston being determined by the stored pressure for returning the piston.

3,969,989

IMPACT BUFFER FOR IMPACT DRIVE TOOLS

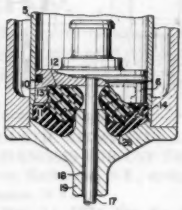
Werner Maurer, Zizishausen, and Erich Skuthan, Holzmaden, both of Germany, assignors to Karl M. Reich Maschinenfabrik GmbH, Nuertingen, Germany

Filed July 24, 1974, Ser. No. 491,264

Claims priority, application Germany, Aug. 2, 1973, 2339163

Int. Cl.[2] F01B 11/02

U.S. Cl. 92—85 R 6 Claims



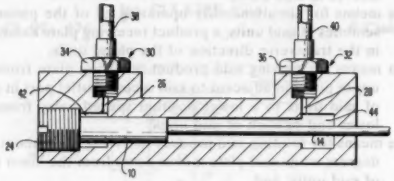
1. In an impact drive tool for driving nails or similar articles having a percussive piston mounted for movement in a cylinder, means for directing a pressure medium into one end of the cylinder to initiate an impact stroke driving the piston toward the other end of the cylinder, and impact buffer means positioned to absorb driving energy at the end of the impact stroke, wherein said buffer means comprise a first buffer element secured to said piston to face the other end of the cylinder, and a second buffer element secured to the other end of the cylinder, the improvement wherein said first buffer element comprises a material having an open cell structure in which the open cells are distributed substantially uniformly whereby the volume of said first buffer element is compressible, wherein said second buffer element comprises an elastic material which is harder than the material of the first buffer element, wherein said percussive piston has a surface facing toward said other end of said cylinder, said first buffer element having a portion projecting toward said other end of said cylinder past said piston surface, said second buffer element having a cavity open toward said percussive piston and a ring surface surrounding said cavity and positioned to be struck by said surface of said piston, said ring surface of said second buffer element having radially extending grooves, said cavity in the second buffer element being positioned so that the first buffer element is compressed in said cavity prior to the piston reaching its work stroke end position in which the piston impacts on said annular surface of the second buffer element, the first buffer element substantially filling the available space of said cavity in said second buffer element when the piston has reached the end of said impact stroke, said radially extending grooves allowing escape of the air expelled from said open cell structure of the first buffer element.

3,969,990

SELF-SNUBBING MINIATURE PISTON ASSEMBLY

Bayard G. Gardineer, Patterson, and Hugh A. Panissidi, Peekskill, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 319,818, Dec. 29, 1972, abandoned.
This application Aug. 2, 1974, Ser. No. 494,253
Int. Cl.[2] F15B 15/22; F01B 11/02
U.S. Cl. 92—85 B 22 Claims



1. A self-snubbing miniaturized piston assembly comprising:
a. a cylinder having a diameter on the order of one-eighth inch which is adapted to contain a working fluid, said cylinder also having spaced from one end thereof a port having a cross-sectional area sufficiently large to permit the unimpeded flow of said working fluid, said port serving as both the sole outlet and the sole inlet means for said fluid at that end of said cylinder;
b. a piston having a diameter on the order of one-eighth inch disposed for reciprocal displacement in said cylinder, said piston having a cross-sectional area at least a first portion thereof sufficient substantially to prevent the flow of said fluid past said first portion when said first portion is in at least a first portion of said cylinder, said piston also having a cross-sectional area at at least a second portion thereof sufficiently smaller than the cross-sectional area of said cylinder at at least as second portion thereof to permit the impeded flow of said fluid between said second portion of said piston and said second portion of said cylinder, the cross-sectional area of said first portion of said piston being equal to the cross-sectional area of said second portion of said piston and said second portion of said cylinder extending from a first end of said cylinder at least to the edge of said port adjacent to said first portion of said cylinder; and
c. means for displacing said piston in said cylinder, whereby the displacement of said piston is snubbed rapidly as the leading edge of said second portion of said piston passes said port and is thereafter snubbed gradually as the leading edge of said second portion of said piston continues its displacement in said second portion of said cylinder.

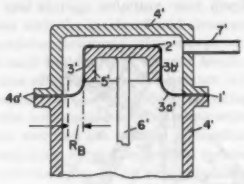
3,969,991

ROLLING DIAPHRAGM AND ROLLING DIAPHRAGM DEVICES

Donald W. Comstock, Lexington, and Peter B. Marchetti, Westford, both of Mass., assignors to Bellofram Corporation, Burlington, Mass.

Filed Mar. 3, 1975, Ser. No. 554,945
Int. Cl.[2] F01B 19/00; F16J 3/02
U.S. Cl. 92—99 2 Claims

2. A substantially hat-shaped rolling diaphragm as a separate structure including a cylinder clamping flange having a radially inner relatively large diameter, a piston clamping flange parallel to said cylinder clamping flange having a radially outer edge of relatively small diameter and a rolling wall extending between said cylinder clamping flange and said radially outer edge of said piston clamping flange wherein said rolling wall (3′) includes a first region (3*a*′) immediately adjacent said cylinder clamping flange (1′), the radii of the transverse cross-sections of said first region (3*a*′) decreasing at a relatively rapid rate in axial direction from the plane defined by said cylinder clamping flange (1′) toward the plane defined by said piston clamping flange (2′), the radial cross-sections of said first region (3*a*′) of said rolling wall (3′) having radii of curvature (R_B) larger than one fourth of the difference between said radially inner diameter (D_C) of said cylinder clamping flange (1′) and the diameter (D_P) of said



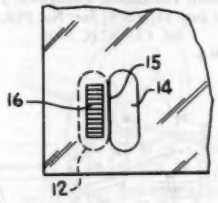
radially outer edge of said piston clamping flange (2′), and wherein said rolling wall (3′) includes a second region (3*b*′) relatively remote from said cylinder clamping flange (1′), the radii of the transverse cross-sections of said second region (3*b*′) decreasing at a relatively slow rate in axial direction from the plane defined by said cylinder clamping flange (1′) toward the plane defined by said piston clamping flange (2′).

3,969,992

METHOD OF FASTENING SHEET MATERIAL

Franklin J. Calderazzo, Norwalk, Conn., assignor to Pitney-Bowes, Inc., Stamford, Conn.

Filed Dec. 4, 1975, Ser. No. 637,692
Int. Cl.[2] B31F 5/02
U.S. Cl. 93—1.1 10 Claims



1. A method of mechanically bonding a plurality of sheets of material so as to form a unitized body of sheets, comprising the steps of:
a. supporting as a unitized mass, a plurality of sheets of material for the purpose of mechanically bonding said sheets together;
b. perforating said mass of sheet material so as to form a multilayered flap in said mass of sheets;
c. folding said multilayered flap upon said mass of sheets; and
d. simultaneously crimping said multilayered flap and said mass of sheets by pressing-in undulations so as to form a mechanical bond in the mass of sheets, in the multilayered flap, and between the multilayered flap and said mass of sheets, so as to form a unitized body of sheets.

3,969,993

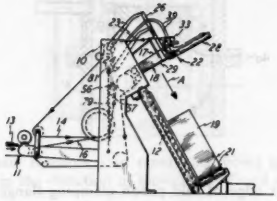
SEPARATOR FOR A SHEET STACKER

Anton R. Stobb, Pittstown, N.J., assignor to Stobb, Inc., Clinton, N.J.

Filed July 7, 1975, Ser. No. 593,849
Int. Cl.[2] B31B 1/98
U.S. Cl. 93—93 C 12 Claims

1. A separator for a sheet stacker, comprising a support for receiving a stack of sheets, a stack conveyor on said support,

a conveyor assembly extending to said support for transporting sheets in a stream and into a stacked relation on said stack conveyor, a sheet counter for counting the sheets passing into the stacked relation, a stack separator plate movably mounted adjacent said stack conveyor for movement into said stream for intercepting said stream and for movement in the direction along the extent of said stack conveyor for defining one end



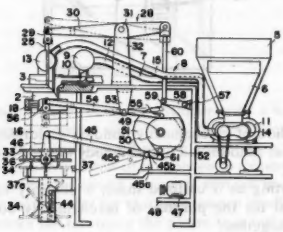
of a stack of sheets on said stack conveyor, control mechanism operatively connected with said stack separator plate for movement of said stack separator plte into the stream, and said sheet counter and said control mechanism being operatively interconnected for movement of said separator plate into said stream after a selected number of sheets have moved into said stack.

3,969,994

APPARATUS FOR FORMING RING-SHAPED FOODSTUFFS

Ryutaro Kaneko, and Yoshio Kaneko, both of 8, Sanno-cho 1-chome, Minami, Yokohama, Kanagawa, Japan

Filed July 11, 1975, Ser. No. 595,309
Int. Cl.² A21C 9/06
U.S. Cl. 99—450.6 **6 Claims**



1. In an apparatus for forming ring-shaped foodstuffs having annular fillings therein, said apparatus comprising:

a plurality of forming units disposed side by side, each unit comprising an outer pipe, and inner pipe concentrically disposed within said outer pipe with an annular space therebetween, the lower end of said inner pipe extending beyond the lower end of said outer pipe to define a first outlet post of an enclosure material of the foodstuffs, a cylindrical sleeve slidably mounted on the outer circumferential surface of said outer pipe to have a lowered position closing said first outlet port and an elevated position opening said first outlet port, a member urged against the lower open end of said inner pipe to normally close said open end, a piston assembly adapted for pushing a filling material in said inner pipe downwardly against the urging force of said member to form a second outlet port for said filling material between the lower end of said inner pipe and said urged member;

a first hopper for storing the enclosure material of the foodstuffs;

a second hopper for storing the filling material of the foodstuffs;

a first pipe means for feeding said enclosure material in said first hopper into the annular space between the inner and outer pipes in each of said units;

a second pipe means for feeding said filling material in said second hopper into said inner pipe in each of said units;

a means for simultaneously operating all of the cylindrical sleeves in said units;

a means for simultaneously operating all of the piston assemblies in said units; a product receiving plate extending in the transverse direction of the plural units;

a means for moving said product receiving plate from the upper position adjacent to said second outlet port in each of said units to a lower position spaced away from the lower end of each of said units;

a means for rotating said product receiving plate about 180 degrees while said plate moves down from the lower ends of said units; and

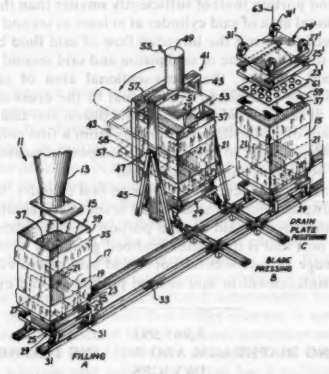
means for driving said cylindrical sleeves operating means, said piston assemblies operating means, and said product receiving plate rotating means in predetermined time relationships.

3,969,995

APPARATUS FOR MAKING LARGE SIZED BLOCKS OF CHEESE

Grant Edward Krueger, and Richard John Leitner, both of Green Bay, Wis., assignors to Kraftco Corporation, Glenview, Ill.

Filed Aug. 13, 1973, Ser. No. 388,101
Int. Cl.² A01J 25/11
U.S. Cl. 99—458 **14 Claims**



1. Apparatus for manufacturing a block of cheese from curd in particulate form, comprising, in combination, an open ended container for holding the curd and having a peripheral configuration substantially identical to the desired block shape of the cheese to be manufactured, blade means including at least one V-shaped blade adapted to extend into said container from one end thereof for direct contact with curd therein, said blade including side walls connected along one corresponding edge of each wall and diverging from the connected edges to define said V-shaped blade, said side walls being perforated generally uniformly over substantially their entire surfaces and being spaced apart at the spaced edges a maximum distance of 2 inches, means for inserting and removing said blade means from within said container, said blade means extending substantially throughout a vertical cross section of said container when inserted therein, whereby

insertion of said blade means facilitates drainage of whey from the curd, and subsequent removal of said blade means permits knitting together of the curd to provide a cheese block of uniform texture.

3,969,996

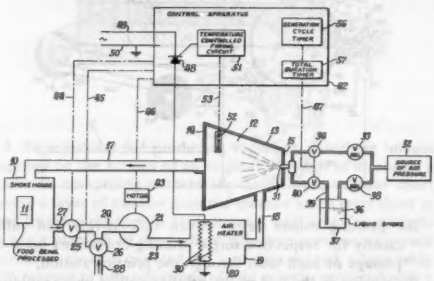
APPARATUS FOR LIQUID SMOKE REGENERATION

Min-Nan Huang, Madison, and Neil F. Walter, Lodi, both of Wis., assignors to DEC International, Inc., Madison, Wis.

Filed Apr. 10, 1975, Ser. No. 566,766

Int. Cl.[2] A23B *4/04*

U.S. Cl. 99—476 **8 Claims**



1. In the combination of a food smokehouse, a smoke generator having a vaporizing chamber and a nozzle through which liquid smoke is introduced into the chamber to produce smoke vapor therein, and duct means connecting the chamber and the smokehouse for conducting the smoke vapor to the smokehouse, the improvement comprising:

air heater means externally of said chamber, means defining an air passage between the air heater means and the chamber, and means for producing a flow of heated air from the air heater means into said chamber, said air heater means producing an air temperature of at least 500°F. in said chamber for vaporizing the liquid smoke from said nozzle.

3,969,997

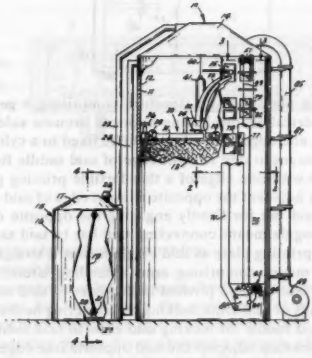
SEALED STORAGE UNIT WITH ACCESS

Darwin O. Haag, 411 W. Walworth Ave., Elkhorn, Wis. 53121

Continuation-in-part of Ser. No. 327,422, Jan. 29, 1973, abandoned. This application Nov. 1, 1974, Ser. No. 519,991

Int. Cl.[2] A01F *25/18, 25/20, 25/22*

U.S. Cl. 99—646 S **2 Claims**



1. A sealed storage unit comprising a substantially completely sealed storage structure adapted to contain a perishable material, sealed loading and unloading chutes in communication with the interior and exterior of said structure, unloading means positioned at the top of said perishable material and constructed to convey said material into said unloading chute, raising and lowering means for said unloading means in sealed communication with said sealed storage structure, and a building unit with a diaphragm disposed in said building comprising a pressure balancing means disposed outside and spaced from said storage structure, said diaphragm in fluid communication with the inside of said structure by means of two sealed conduits communicating independently with said structure and said building at different levels, said pressure balancing means effecting pressure balance without substantial entry of outside air, said pressure balancing means being substantially the sole source of communication between the interior of said unit and the outside atmosphere, said sealed storage unit requiring no gas separation means or gas return conduits in communication with said unloading means.

3,969,998

PRINTING ACTUATOR

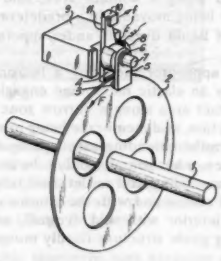
Hilrich Jan Matthijs Venker, Heemstede, Netherlands, assignor to Compagnie Honeywell Bull (Societe Anonyme), Paris, France

Continuation of Ser. No. 479,416, June 14, 1974, abandoned, which is a continuation of Ser. No. 308,876, Nov. 22, 1972, abandoned. This application Mar. 3, 1975, Ser. No. 554,626

Claims priority, application France, Nov. 30, 1971, 71.42939

Int. Cl.[2] B41J *9/02*

U.S. Cl. 101—93.48 **13 Claims**



1. A striking device for a printing machine comprising, in combination:

an axle defining a pivot axis;

a plurality of hammers pivotally mounted on said axle;

a continuously rotating shaft disposed in spaced parallel relation to said axle;

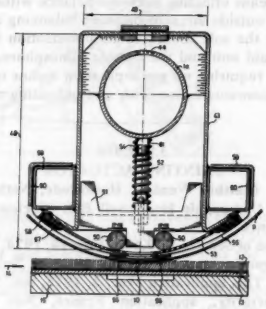
electromagnetic means associated with each individual hammer for selectively causing said individual hammer to pivot on said axle to perform a strike, each said electromagnetic means including a magnetic frame defining a closed magnetic circuit having an air gap and formed in part by a pair of magnetic arms rotatable around said pivot axis and connected to said individual hammer, said pair of magnetic arms extending from said axle toward said shaft and having free end portions presenting spaced poles defining said air gap, means for selectively creating a magnetic flux field between said free end portions across said air gap, and a disc of non-magnetic, electrically conductive material fixed to said continuously rotating shaft so as to rotate continuously therewith, said disc having opposite side faces, said arms straddling said disc to position said disc within said air gap whereby, when said magnetic flux field is created between said free end portions across said air gap, said flux field causes currents to flow in said disc, which currents act forcibly on said pair of magnetic arms to move said hammer.

3,969,999

DYESTUFF APPLICATOR FOR SCREEN PRINTER

Peter Zimmer, Untere Sparchen 54, A 6330 Kufstein, Austria

Filed Jan. 31, 1974, Ser. No. 438,282
Claims priority, application Austria, Feb. 7, 1973, 1096/73
The portion of the term of this patent subsequent to Jan. 24, 1992, has been disclaimed.
Int. Cl.² B41F 15/40, 15/44
U.S. Cl. 101—120 5 Claims



1. In a printing machine, in combination:
an apertured printing screen overlying a substrate to be imprinted along a contact area, said screen and said substrate being movable in a predetermined direction;
a source of liquid dyestuff under superatmospheric pressure;
a dyestuff applicator including a housing with a bottom closed by an elastic membrane engaging said screen in said contact area along a narrow zone perpendicular to said direction, said membrane being provided in said zone with an outlet extending substantially completely across said screen, a horizontal supply tube in said housing with an axis paralleling said outlet, said tube communicating with said source and with the interior of said housing to fill said interior with said dyestuff, and a downwardly extending guide structure fixedly mounted on said tube; and
loading means in said housing slidably engaging said guide structure, said loading meand supplementing the pressure exerted by said dyestuff upon said membrane in urging same into firm contact with said screen around said outlet.

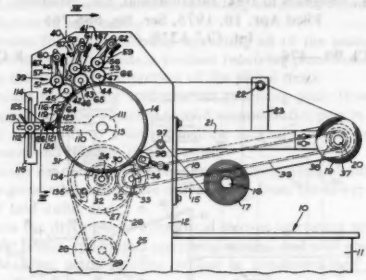
3,970,000

LABEL STOCK OVERPRINTING MACHINE

Jack Rowley, Congleton, England, assignor to Berisfords Limited, Congleton, England

Filed Dec. 6, 1974, Ser. No. 530,135
Claims priority, application United Kingdom, Sept. 12, 1974, 39771/74
Int. Cl.² B41F 5/06, 5/16
U.S. Cl. 101—181 7 Claims

1. A machine for overprinting continuous woven label stock comprising:
a printing station,
a support for supporting the woven label stock and progressing it past the printing station,
the printing station including a printing head consisting of a printing roller carrying an impression of data to be printed and an inking arrangement,
a drive means for the printing roller sufficiently for a single printing operation upon the passage of each label of the woven label stock through the printing station,
a sensor means for initiating the driving of the printing roller through the sensing of a datum mark on each label of the woven label stock,
a separate printing head for each color to be printed,
each printing head including a respective printing roller carrying a respective impression of the respective data to be printed and a respective inking arrangement,



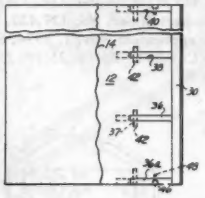
the printing rollers being driven successively and sufficiently for respective single printing operations upon te passage of each label through the printing station,
the driving of the first of the printing rollers being initiated by the sensor means serving to sense the datum mark on each label,
and the driving of each succeeding printing roller being initiated from the rotation of the preceding printing roller.

3,970,001

LOCK-UP FOR THIN PRINTING PLATE

Leslie Mollon, Southfield, and John E. Kline, Farmington, both of Mich., assignors to Brooks & Perkins, Incorporated, Southfield, Mich.

Filed Oct. 26, 1972, Ser. No. 300,903
Int. Cl.² B41F 27/06
U.S. Cl. 101—415.1 3 Claims



1. Printing plate lock-up structure comprising a generally partly cylindrical saddle having opposite arcuate side edges and straight end edges and adapted to be fixed to a cylindrical press roll, means at one straight edge of said saddle for fixed engagement with one edge of a thin flexible printing plate, a movable bar adjacent the opposite straight edge of said saddle, means on said bar for fixedly engaging the opposite edge of said plate, toggle means connecting said bar to said saddle to tension the printing plate as said toggle means is straightened, said toggle means comprising arms extending laterally from the ends of said bar and pivoted to the sides of said saddle at the outer ends of said arms, locking means acting between said arms and said saddle for locking said arms to said saddle with said bar in position adjacent the said opposite free edge of said saddle and against said press rolls, said locking means comprising outwardly biased spring pressed pins in the sides of said saddle, and openings in said arms adapted to receive the ends of said pins when said bar is in position against said press roll.

3,970,002

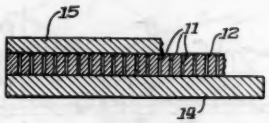
IMAGE TRANSFER LAYERS FOR INFRARED TRANSFER PROCESSES

Joseph Gaynor, Arcadia, Calif., assignor to Bell & Howell Company, Chicago, Ill.

Division of Ser. No. 83,397, Oct. 23, 1970, Pat. No. 3,730,091. This application Feb. 7, 1973, Ser. No. 330,337

Int. Cl.² B41M 5/02; G01N 21/34

U.S. Cl. 101—463 7 Claims



1. In a process for producing radiation absorbing images disposed on the surface of an original the steps of disposing a sandwich comprising a thermally anisotropic transfer sheet having a layer of transfer material thereon and a copy sheet in heat transfer relation to said original, said transfer material having a plurality of thermally conductive particles dispersed therethrough and oriented in a predetermined relationship with respect to other portions of said transfer material with a greater thermal conductivity in a direction perpendicular to the surface of said transfer sheet than in a parallel direction, exposing said images on said original to radiant energy sufficient to generate a heat pattern thereon, preferentially heating said particles and transferring said heat pattern to said layer of transfer material whereby said transfer material is transferred and adhered to said copy sheet in a pattern corresponding to said heat pattern.

3,970,003

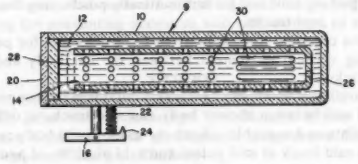
PYROPHORIC FLARE

Frederick R. Hayward, Westford, and L. James Larson, Boxford, both of Mass., assignors to Avco Corporation, Cincinnati, Ohio

Filed Oct. 16, 1974, Ser. No. 515,182

Int. Cl.² F42B 4/26

U.S. Cl. 102—37.8 5 Claims



1. A pyrophoric flare comprising:
a. a frangible container;
b. a pyrophoric substance contained in said container;
c. means for fragmenting the container for releasing the pyrophoric substance to the atmosphere; and
d. measuring means for containing a portion of said pyrophoric substance and for gradually releasing measured amounts of said pyrophoric substance into the atmosphere to extend the duration of the flare.

3,970,004

SPINNING PROJECTILE

Xaver Suter, Thalwil, Switzerland, assignor to Werkzeugmaschinenfabrik Oerlikon-Buhrle, Zurich, Switzerland

Filed Nov. 25, 1974, Ser. No. 526,750

Claims priority, application Switzerland, Dec. 21, 1973, 17993/73

Int. Cl.² F42B 13/10

U.S. Cl. 102—56 SC 7 Claims

1. A spinning projectile comprising a projectile body, a hollow charge component rotatably mounted in the projectile body and axially displaceable by propellant gases, means for maintaining the hollow charge component in the displaced position, said maintaining means comprising locking elements which hold the hollow charge component in the displaced position at the projectile body even after abatement of the propellant charge pressure.

3,970,005

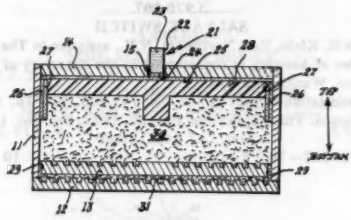
MASS FOCUS EXPLOSIVE LAYERED BOMBLET

Mathew Rothman, Seminole County, Fla., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jan. 25, 1969, Ser. No. 803,521

Int. Cl.² F42B 13/18, 13/48

U.S. Cl. 102—67 3 Claims



1. A fragmentation-type munition comprising:
a. a centrally located main explosive charge;
b. means for peripherally initiating said main explosive charge, wherein said means for peripherally initiating said main explosive charge includes:
1. a detonator;
2. and, a flexible sheet-type high explosive abutting said detonator and the periphery of said centrally located main explosive charge;
c. and, an outer case housing said main explosive charge and at least partially housing said means for peripherally initiating said main explosive charge, with said outer case having at least an internal portion thereof weakened to promote fragmentation thereof.

3,970,006

PROTECTIVE COVER FOR A MISSILE NOSE CONE

Robert L. Copeland, Marion, Va.; Ralph F. Greene, Wichita Falls, Tex.; David R. Beeler, Cincinnati, Ohio; Robert A. Eastridge, Saltville, Va., and Vance A. Chase, Poway, Calif., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

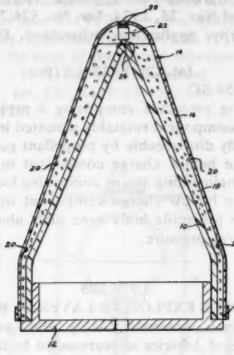
Filed Jan. 16, 1975, Ser. No. 541,487

Int. Cl.² F42B 13/00

U.S. Cl. 102—105 2 Claims

1. A protective cover for a nose cone of a missile, normally mounted external to an aircraft in captive flight, which is removable before arming and firing of the missile, comprising: a rigid cover of cross-linked polyethylene spaced from said nose cone; a semirigid backing of polyurethane foam in the space between the missile and said cover; a linear triangular shaped charge positioned in a pedetermined serpentine pat-

tern between the cover and the backing; the apex of the triangle of said triangular shaped charge being remote from said



cover; means for detonating said linear triangular shaped charge to thereby cut the cover to permit removal of the cover and backing by aerodynamic forces.

3,970,007

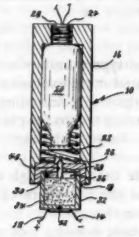
SALVAGE SWITCH

Joseph R. Klein, East Northport, N.Y., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Continuation-in-part of Ser. No. 743,906, July 10, 1968, abandoned. This application Jan. 20, 1971, Ser. No. 112,492

Int. Cl.[2] F42C *13/00*

U.S. Cl. 102—70.2 P **10 Claims**



1. A salvage switch comprising a hollow protective case, said case containing therein a cartridge, an actuator operably associated with said cartridge and a biasing means for holding said cartridge in an inoperative position, a container having a piercing means operably attached thereto being mounted on the underside of said case, and said piercing means protruding into said case and being capable of penetrating said cartridge, whereby actuation of said actuator drives said cartridge against the force of said biasing means and into an operative position wherein said piercing means penetrates said cartridge.

3,970,008

WALKING BEAM CONVEYER

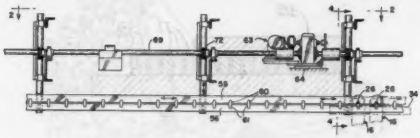
Alvin Borsuk, and Charles H. Johnson, both of Madison, Wis., assignors to Oscar Mayer & Co. Inc., Madison, Wis.

Filed Mar. 11, 1975, Ser. No. 557,301

Int. Cl.[2] B61B *13/00*

U.S. Cl. 104—162 **21 Claims**

1. Apparatus for intermittently driving a unit supported for guided movement along a given path through a given distance and locking the unit in a given position, comprising: a locking bar and a moving bar, each said bar having a plurality of connecting means equally spaced apart therealong for selective connection with the unit, means above said bars for supporting and driving said bars together along a first axis extending perpendicular to said given path of movement such that one bar is at all times connected to the unit and such that as one bar connects to the unit the other bar disconnects from the unit, said locking bar being rigidly connected to said supporting and driving means and said moving bar being slidably



supported thereby for movement along an axis parallel to said given path of movement, and means driving said moving bar when it is connected to the unit through a given distance to align one connecting means thereof with the next adjacent connecting means of the locking bar to move the unit to a new position and to return the moving bar to its starting position when it disengages from the unit and a connecting means of the locking bar engages the unit, whereby the locking bar locks the unit in a given position and the moving bar moves the unit from one position to another.

3,970,009

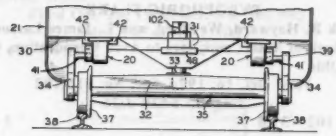
FLUID RAILROAD PASSENGER CAR SUSPENSION

John C. Schultz, Buffalo, N.Y., assignor to Houdaille Industries, Inc., Buffalo, N.Y.

Filed Sept. 24, 1973, Ser. No. 399,918

Int. Cl.[2] B61F *3/08, 5/16, 5/24, 5/38*

U.S. Cl. 105—164 **20 Claims**



1. In a railroad car suspension system wherein the car has a body and trucks spaced longitudinally under the body for running along rails and for automatically positioning the body relative to said trucks,

means coupling the car body to the trucks and for permitting vertical movement between the car body and said trucks,

a plurality of reversible hydraulic actuator means connected to and between the car body and said trucks at different points and operable selectively to move the body relative to said truck at said points and said plurality of hydraulic actuator means connected to and between said car body and said trucks so that rotation of said body can occur about vertical axes through each truck,

means providing a dynamic power source,

and control means for selectively controlling the power source for supplying hydraulic fluid under pressure to said actuator means to operate the actuator means for varying the verticle positions of the car body relative the trucks at said points, and

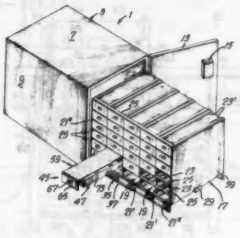
a plurality of sensor means connected to said control means and supplying inputs thereto such that said plurality of actuator means are operated to position said body relative to said trucks.

3,970,010

SAFE DEPOSIT BOX SYSTEM

Ross H. Cantley, 577 Essex Road, Beaconsfield, Quebec, Canada

Filed Mar. 20, 1974, Ser. No. 453,088
Int. Cl.[2] A45C 1/12; A47B 88/20; E05B 65/46; E05G 1/08
U.S. Cl. 109—56 3 Claims



1. A safe deposit box storage system comprising a storage housing having bottom, inner, side, top and rear walls defining a predetermined space having an open front of a predetermined width and a height, a frame defining compartments, the frame having dimensions such that it closely fits within the predetermined space and including a depth materially exceeding the width of said open front with the number of said compartments materially exceeding that accommodatable within said open front, track means for mounting the frame in the housing for sliding movement into and out of the housing through said open front, said track means including a pair of parallel slide members, one mounted to each side wall and to the sides of the frame, such that the frame may be slid out in line from a position completely within the confines of the housing, the frame comprising a plurality of vertical and horizontal partitions defining said compartments, said compartments extending substantially perpendicular to the direction of movement of the frame into and out of the housing and access to the compartments being from the side of the frame, a safe storage box for mounting snugly in each compartment, each safe storage box including an elongated open walled container, a cover hinged to the container, the cover extending past one end of the container and having a flanged extension flush with the side of the frame and closing the opening to the respective compartment, the flanged extension of the cover carrying locking means for use in locking the storage box to a partition forming each compartment to lock the box in the frame, and means for locking said frame within the housing for preventing access to said safe storage.

3,970,011

COMBUSTION WITH FLUIDIZABLE BED

Michael John Virr, Stourbridge, and Douglas Ernest Elliott, Sutton Coldfield, both of England, assignors to Fluidfire Development Limited, England

Filed Feb. 4, 1975, Ser. No. 546,943
Int. Cl.[2] F23G 5/00
U.S. Cl. 110—8 F 12 Claims

1. Apparatus comprising:

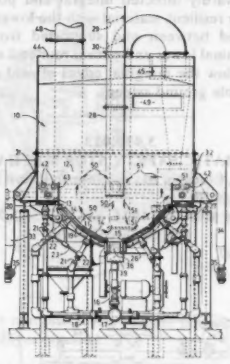
a. a combustion chamber,

b. a support adapted to support a bed of particles in the combustion chamber and to admit gas to the bed so that the bed can be fluidised,

c. first discharge means for discharging nongaseous material into the bed,

d. second discharge means in the form of a weir for discharging solids from the bed,

e. third discharge means for discharging from the bottom of the bed solid material which does not fluidise, and



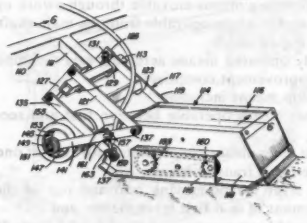
f. feed means for mixing a gaseous fuel and air and feeding the mixture into the bed through said support at a rate such as to fluidise at least a part of the bed.

3,970,012

SOIL AGITATING DEVICE

Donald F. Jones, Sr., Warren, Minn. 56762

Filed Feb. 21, 1975, Ser. No. 551,971
Int. Cl.[2] A01C 23/02; A01B 49/06, 33/02
U.S. Cl. 111—6 6 Claims



1. A soil working apparatus for support from a farm implement support member and movement along the ground in contact with the latter, said apparatus comprising a downwardly opening housing defining front and rear ends and including opposite side walls, front and rear transverse shafts extending between and journaled from said side walls, said shafts each including generally radially outwardly projecting and circumferentially axially spaced ground impaling spikes supported therefrom for rotation therewith, the lower end portions of the lower spikes on said shafts projecting downwardly below the lower marginal portions of said side walls, and means drivingly connecting said front shaft to said rear shaft for rotation of the latter in response to rotation of the front shaft and at a slightly greater angular speed than the angular speed of rotation of said front shaft, said side walls including corresponding upper marginal edges and corresponding upstanding front and rear marginal edges, said front and rear edges being rearwardly and forwardly upwardly inclined, respectively, upper and lower transverse braces extending between and secured to corresponding upper and lower end portions of said edges, said housing including a top wall extending between said upper marginal edges of said side walls and having the opposite end portions thereof disposed

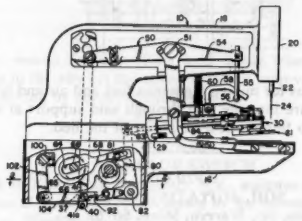
between and supported from said upper transverse braces, corresponding ends of said walls including front and rear end walls extending therebetween, said top wall comprising a sheet of flexible resilient material, said end walls comprising opposite end downwardly directed integral end portions of said sheet of flexible resilient material with the lower end portions thereof disposed between and supported from said lower braces, the terminal lower end of said rear end wall projecting downwardly below the marginal edges of said side walls and defining a flexible ground sweep.

3,970,013

AUTOMATIC SAFETY STOP MECHANISM

James C. Hsiao, Chicago, Ill., assignor to Union Special Corporation, Chicago, Ill.

Filed Mar. 31, 1975, Ser. No. 563,759
Int. Cl.² D05B *3/00*
U.S. Cl. 112—67 **6 Claims**



1. A sewing machine having a main shaft means,
work clamping means;
lever means for raising and lowering said work clamping means;
article indexing means movable through awork cycle;
force transfer means operable from the main shaft whereby indexing an article;
manually operated means actuating said machine wherein the improvement comprises:
safety stop means including:
first lever means operable between first and second positions;
said first lever means cooperating with at least one member of the force transfer means,
second lever means moving into and out of the path of movement of said first lever means; and
said second lever means connected to and controlled by the movement of said raising and lowering means and said manually operated means whereby said first lever means lies in an abutting relationship with said second lever means preventing the movement of said second lever means into its operative position when said article indexing means is not moved through said predetermined cycle.

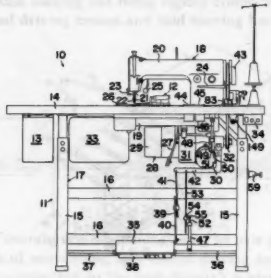
3,970,014

AUTOMATIC SEWING MACHINE

Takashi Chano, Yokohama, and Koji Masuda, Sagamihara, both of Japan, assignors to Kayabakoyo-Kabushiki-Kaisha, Tokyo, Japan

Filed Nov. 6, 1974, Ser. No. 521,210
Int. Cl.² D05B *19/00*
U.S. Cl. 112—121.11 **5 Claims**

2. An automatic sewing machine, comprising operating means for performing a plurality of operations, including sewing of a seam on upper and lower sheet materials which are to be joined and have side edges; selectively actuatable control means for controlling at least some of said operations in a programmed sequence; and alignment control means responsive to operation of said selectively actuatable control means for independently maintaining the side edge of each of said upper and lower sheet materials in a position parallel to and at a predetermined spacing from said seam irrespective of deviations of the respective side edge from said position in direction toward or away from said seam, including upper and lower manipulator members each having an arm extending



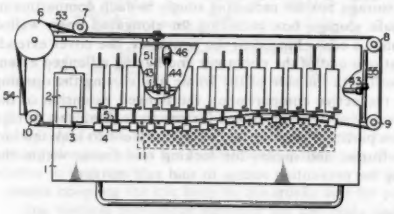
toward the upper and lower side of said sheet materials, respectively, and a driven pinion rotatably carried at a free end of the respective arm for engaging the respective sheet material and, in response to deviations of the respective side edge, shifting the respective sheet material relative to said seam so as to maintain the respective side edge in said position parallel to and at a predetermined spacing from said seam.

3,970,015

AUTOMATIC SEAMING METHOD AND LONG SEAMER THEREFOR

Yoshinobu Fukuyama, Kashiwara, Japan, assignor to Takatori Machinery Works Ltd., Japan

Filed May 30, 1975, Ser. No. 582,216
Claims priority, application Japan, Nov. 8, 1974, 49-129356; Mar. 4, 1975, 50-25565
Int. Cl.² D05B *21/00*
U.S. Cl. 112—121.12 **8 Claims**



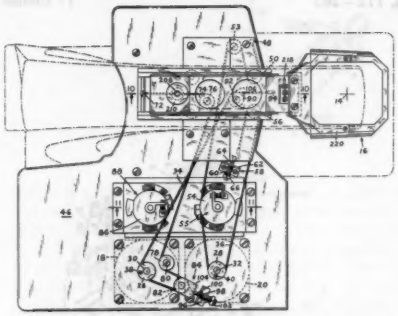
1. An automatic seaming method for seaming fabrics by means of a long seamer comprising a sewing machine head at an end of a working table, a plurality of patterning devices arranged in parallel and upstream from said sewing machine head, an endless and flexible flat member guided by said patterning devices which moves the fabric to be seemed to the sewing machine head characterized by the steps of:
deforming a flexible guide band to a curve by means of said plurality of patterning devices, along which curve seaming is carried out by said sewing machine head;
guiding the endless and flexible flat member by means of corresponding guide devices on said patterning devices along a curved passage similar to the curve of the flexible guide band;
moving clothes to be seamed together with the movement of said endless and flexible flat member along the curved surface of said flexible guide band in such a way that all portions on the stitching line of said clothes or garment

sections are moved along the same curved passage; stitching said clothes by the sewing machine head.

3,970,016
AUTOMATIC SEWING MACHINE

Florian F. Yanikoski, Braintree, Mass., assignor to Union Special Corporation, Chicago, Ill.

Filed Aug. 12, 1974, Ser. No. 496,749
Int. Cl.² D05B *21/00*
U.S. Cl. 112—121.12 **59 Claims**



10. An automatic sewing machine for moving a movable element and work piece relative to a needle, comprising:

a pivoting means for pivoting the movable element and work piece around a pivot point,

an extendable arm carried by the pivoting means for translating the movable element and work piece radially with respect to said pivot point,

first mechanical drive means for driving said pivoting means,

second mechanical drive means for driving said extendable arm, with said first and second drive means having a fixed position relative the needle and being spaced from both said pivoting means and extendable arms,

first linkage means connecting the first drive means to the pivoting means, and

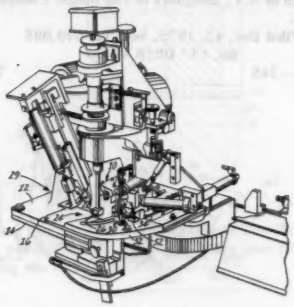
second linkage means connecting said second drive means to said extendable arm for moving the movable element and work piece relative to the needle so that approximately a straight line is traced on the work piece whenever the movable element is pivoted about said pivot point.

3,970,017
FABRIC EDGE FINISHING MACHINES

Edward S. Babson, Ipswich; Oliver C. Brett, Jr., West Boxford; Warren A. Cavicchi, Ipswich, and Carlton G. Lutts, Salem, all of Mass., assignors to USM Corporation, Boston, Mass.

Filed Nov. 11, 1974, Ser. No. 522,734
Int. Cl.² D05B *21/00*
U.S. Cl. 112—121.12 **9 Claims**

5. In combination with a sewing machine having stitching instrumentalities including a reciprocable needle, a reciprocable edge trimmer, a work support and means for rectilinearly feeding multi-sided flexible workpieces on the support to and through the operating localities of the needle and the trimmer, each piece initially having a thicker inner portion delineating it from its margins, and edge guide having an undercut end adapted to guide the workpieces along the edges of the thicker portion, a corner turning mechanism, and an automatic work guidance control mechanism including a sensor for actuating the corner-turning mechanism, the sensor being responsive to distinction of the margins from the thicker material and being spaced ahead of the knife and needle and more inwardly of the work than the needle whereby each piece is progressively

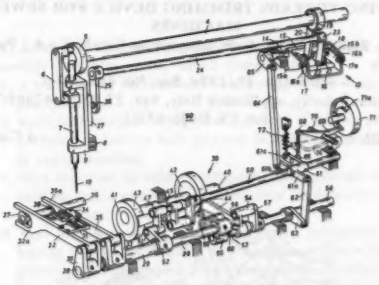


trimmed of its margins as the thicker portion has its corners rounded and edges stitched.

3,970,018
WORK FEEDING MECHANISM FOR SEWING MACHINES

Walter Hager, Kaigerslautern, Germany, assignor to Pfaff Industriemaschinen GmbH, Germany

Filed Aug. 27, 1975, Ser. No. 608,162
Claims priority, application Germany, Sept. 6, 1974, 7430111[U]
Int. Cl.² D05B *27/20*
U.S. Cl. 112—206 **7 Claims**

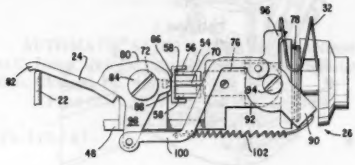


1. A sewing machine for sewing a material workpiece, comprising a needle holder having a sewing needle, means mounting said needle holder for pivotal movement to swing said holder with said needle backwardly and forwardly, a rotatable sewing machine main shaft, means connected between said main shaft and said needle holder to reciprocate said holder with said needle to periodically engage and disengage the workpiece, first and second feed dogs cyclically engageable with the material to be sewn for advancing it in timed relationship to the reciprocation and swinging movement of said needle, means connected to said first and second feed dogs and said sewing machine main shaft to move said first feed dog into engagement with the workpiece during the downward reciprocation of the needle into engagement with the workpiece and to advance it in a feed direction to the final feed position while said needle is swinging in the feed direction and while the second feed dog is moved out of phase with said first feed dog out of engagement with the material from the final feed position and returned to a feed starting position and subsequently engages the material after its release by the first feed dog and the needle from the final feed position during the return of the first feed dog to the starting position.

3,970,019
THREADING APPARATUS FOR SEWING MACHINES

Lionel J. Coulombe, Matawan, and Anthony Giaimo, Staten Island, both of N.Y., assignors to The Singer Company, New York, N.Y.

Filed Dec. 12, 1975, Ser. No. 640,085
Int. Cl.[2] D05B *49/00*
U.S. Cl. 112—245 7 Claims

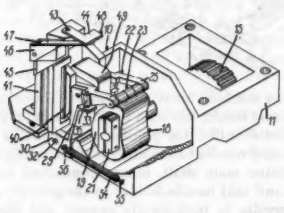


1. In a sewing machine, a tension device including spaced friction discs for applying frictional resistance to movement of a thread therebetween, presser means including means for raising and lowering the presser means responsive to raising and lowering said presser means for initiating movement of said discs toward and away from each other, the improvement comprising, movable thread engaging means disposed in proximity to said tension device, said thread engaging means being operative when said discs are moved toward each other for guiding the thread between and in disposition for operative engagement with said discs.

3,970,020
SEWING THREADS TRIMMING DEVICE FOR SEWING MACHINES

Nereo Bianchi, Pavia, Italy, assignor to Necchi S.p.A., Pavia, Italy

Filed Apr. 19, 1974, Ser. No. 462,387
Claims priority, application Italy, Apr. 27, 1973, 42905/73
Int. Cl. D05b *65/02*
U.S. Cl. 112—252 4 Claims

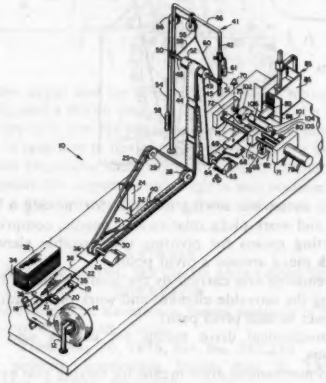


1. A sewing threads trimming device for sewing machines provided with a blade and a counterblade, means to operate said blade at the end of a sewing operation and in a suitable timing relation with the hook and needle movements, in a first displacement over the hook during which a thread loop closes over said blade and thereafter a second movement in the opposite direction to bring the sewing threads into contact with said counterblade and cut them, said trimming device including a cam of magnetizable material deriving its motion from the sewing machine main shaft and a cam follower, said follower being a member of a magnetic circuit, a coil linked to said follower to obtain coupling through magnetic attraction between said cam follower and said cam.

3,970,021
METHOD OF FABRICATING SHIRT CUFFS

James L. Meadows, Honea Path, S.C.; Donald H. Smith, Vidalia, Ga.; Gordon H. Ellington, Vidalia, Ga.; William O. Mitchell, Vidalia, Ga., and W. Wade Frost, Vidalia, Ga., assignors to Oxford Industries, Inc., Atlanta, Ga.

Continuation-in-part of Ser. No. 391,645, Aug. 27, 1973, which is a division of Ser. No. 243,573, April 13, 1972, Pat. No. 3,780,682, which is a continuation-in-part of Ser. No. 79,031, Oct. 8, 1970, Pat. No. 3,675,604. This application July 3, 1974, Ser. No. 485,722
Int. Cl.[2] D05B *19/00*
U.S. Cl. 112—262 17 Claims

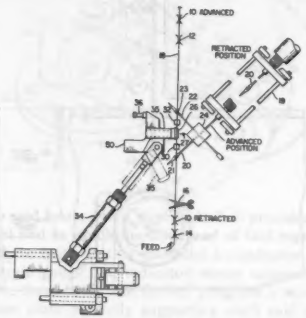


1. A continuous process of forming shirt cuffs or the like comprising moving the free end of a continuous web of lining material or the like from a supply along a path through a sewing machine, placing a series of panels of cuff material or the like in spaced relationship with respect to one another on the web of lining material along the length of the web of lining material before the web of lining material is moved through the sewing machine, folding an edge portion of the series of panels of cuff material about an edge of the continuous web of lining material, sewing through the folds of the series of panels of cuff material and the continuous web of lining material to form a connected series of partially completed cuff assemblies, accumulating a predetermined length of the connected series of partially completed cuff assemblies which extend from the sewing machine, continually cutting the free end of the web between the panels to separate the partially completed cuff assemblies from the connected series of partially completed cuff assemblies in response to the accumulation of at least a first predetermined length of the connected series of partially completed cuff assemblies and terminating the separating of the series of partially completed cuff assemblies in response to the accumulation of less than the first predetermined length of the connected series of partially completed cuff assemblies and terminating the moving of the web of lining material and the series of panels of cuff material through the sewing machine in response to the accumulation of more than a second predetermined length of the connected series of partially completed cuff assemblies.

3,970,022
METHOD AND APPARATUS FOR STITCHING STRING TO FOAM USED IN TAMPONS

William H. Kopatz, Levittown; Rey W. Cooper, Bryn Athyn, and Russell W. Watson, Hatboro, all of Pa., assignors to W. R. Grace & Co., New York, N.Y.

Continuation-in-part of Ser. No. 575,200, May 7, 1975. This application May 7, 1975, Ser. No. 575,198
Int. Cl.² D05B 3/12
U.S. Cl. 112—265 15 Claims



1. A stitching apparatus for attaching a finite length of string to a material such as a foam pre-form for use in a sanitary device comprising:

a. a first needle having an open eyelet near the point thereof;

b. means for advancing and retracting said first needle through said volume of material;

c. a second needle having an open eyelet near the point thereof;

d. means for advancing and retracting said second needle through said pre-form;

e. means for selectively indexing said string into a line which permits the simultaneous engagement of said string by both of said eyelets of said needles; and

f. means for cutting said string at the instant at which the retraction of said needles begins,

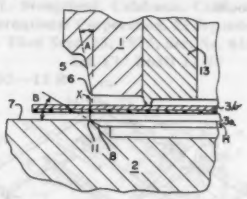
whereby, upon the full retraction of said needles, said pre-form is interiorly stitched along two lines, said lines, at one end of each, being exteriorly integral in the form of a loop and, at the other end of each comprising two ends hanging freely and protruding from said pre-form.

3,970,023
TOOLING ARRANGEMENT FOR END CLOSURE SCORING

Edward J. Herbst, Posen, and Harry A. Peyser, Olympia Fields, both of Ill., assignors to Continental Can Company, Inc., New York, N.Y.

Filed Apr. 25, 1975, Ser. No. 571,450
Int. Cl.² B21D 51/26, 51/46
U.S. Cl. 113—1 F 8 Claims

1. An improved tooling configuration for production of an opening score line in a metal end panel of a can or similar container without fracturing an enamel coating previously applied to the panel, said tooling comprising a punch and an anvil for receiving a panel therebetween, said punch having a flat substantially horizontal bottom face and a lateral outer face, said anvil having a flat substantially horizontal top face, a lateral inner face depending from said top face and a side face depending from said lateral face, said outer face being inclined in the range of about 90° to about 110° relative to said bottom face, said lateral face being inclined in the range of about 25° to about 35° relative to said top face, said punch and said anvil meeting with said bottom face and said top face in substantially parallel relation and said outer face opposing said lateral face, whereby the movement of said punch into

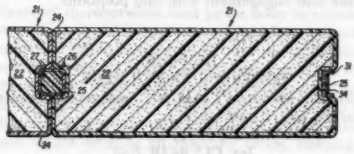


said panel against said anvil displaces a portion of the metal of said panel, thereby forming a score line therein without fracturing the enamel coating.

3,970,024
MODULAR FLOATING LOAD-SUPPORTING ASSEMBLAGE

John A. Fisher, 2458 Red Apple Drive, Dayton, Ohio 45431

Filed Sept. 4, 1975, Ser. No. 610,392
Int. Cl.² B63B 35/72
U.S. Cl. 114—.5 F 10 Claims



1. A floatable load-supporting structure adapted for ease of assembly and disassembly which comprises:

a. a plurality of floatable box-shaped modules disposed in juxtaposition;

b. each said module being provided with a groove about its periphery whereby said grooves in adjacent modules are in contraposition;

c. bars received in said contrapositioned grooves of adjacent modules whereby such adjacent modules are joined by said bars;

d. said joined modules forming a closed polygonal figure having a plurality of sides as seen from above with those grooves of said grooves which face outboard relative said figure providing a continuous channel around the perimeter of said figure; and

e. a continuous tension band provided in said channel around said perimeter, said band being in a state of tension whereby said modules are pressed together into an essentially rigid platform structure.

3,970,025
CATAMARAN

Cedric C. Sovia, 319 S. Lake St., Forest Lake, Minn. 55025, and Kenneth W. Krengel, 1800 Highland Parkway, St. Paul, Minn. 55116

Filed Sept. 11, 1974, Ser. No. 504,966
Int. Cl.² B63B 1/00
U.S. Cl. 114—61 3 Claims

1. A catamaran including:

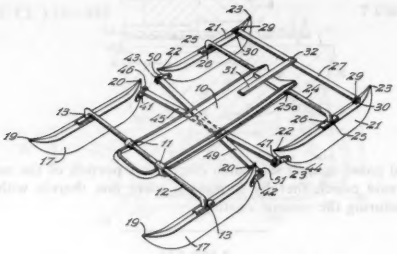
a catamaran frame having a longitudinal centerline,

a forward pair of parallel pontoons connected to said frame on opposite sides of said centerline,

a rear pair of parallel pontoons pivotally connected to said frame on parallel vertical axes on opposite sides of said centerline,

means connecting said rear pontoons for pivotal movement in spaced parallel relation, and

means for moving said connecting means to pivot said rear pair of pontoons,



said forward pair of pontoons being also connected to said frame on parallel vertical pivots,

said frame being of generally rectangular form, and including vertical pivot means extending downwardly from said frame into engagement with said pontoons.

3,970,026

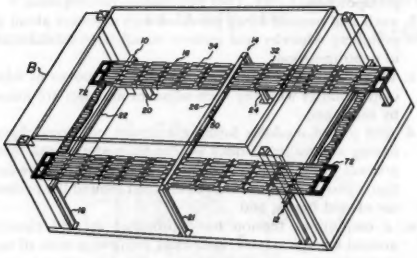
PORTABLE TWEEN DECK

Grady Burton, Mountain Lakes, N.J., assignor to MacGregor-Comarain, Inc., Cranford, N.J.

Filed May 29, 1975, Ser. No. 582,035

Int. Cl.² B63B *3/48*

U.S. Cl. 114—85 **6 Claims**



1. A portable tween deck for watercraft comprising a center support means and two end support means, panel assemblies supported between said center support means and said end support means, said panel assemblies each comprising a plurality of spaced pipes, transverse collars secured to said spaced pipes, said collars have a generally C-shaped cross sectional configuration having a central web and two depending flange portions, said central web having a plurality of spaced openings with each opening having a configuration corresponding to the cross sectional configuration of said pipes, said pipes being accommodated within said openings, longitudinally spaced deck plates bridging the space between said pipes, first connecting means for detachably securing said panel assemblies to said center support means, and second connecting means for detachably securing adjacent panel assemblies to each other.

3,970,027

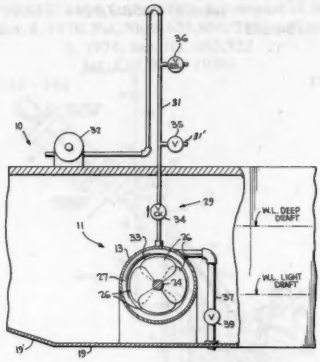
PRIMING MEANS FOR BOW STEERING PUMPS

William M. Jackson, 109 Hursey Ave., Pass Christian, Miss. 39571

Filed Sept. 16, 1975, Ser. No. 613,742

Int. Cl.² B63H *25/46*

U.S. Cl. 114—151 **9 Claims**



1. In a bow steering unit for barges and the like having a bottom hull and a transversely extending casing defining first and second nozzles respectively communicating with spaced first and second openings in said bottom hull, an axial flow pump including at least one propeller unit disposed within a central portion of said casing between said nozzles for steering the vessel in one direction as water is inletted through said first nozzle and outletted through said second nozzle, and in an opposite direction as water is inletted through said second nozzle and outletted through said first nozzle, the improvement comprising a means for priming the blades of said propeller unit during various speeds and operating conditions of the vessel, said priming means comprising a vacuum tube interconnecting a vacuum pump with an upper area of said central portion, whereby any accumulation of air in said propeller unit caused during movement of the vessel may be evacuated and said blades accordingly maintained primed by permitting a sufficient amount of water to flow through one of said nozzles for effectively maintaining said blades submerged, said priming means further comprising at least one inlet tube communicating with a third opening in said hull bottom and extending through said upper area of said tube central portion for permitting water to inlet thereto during negative pressure build-up while water rapidly passes over said openings, said first and second openings each being of a predetermined size and said third opening being of a size substantially less than the size of said first and second openings, whereby the difference in the negative pressure at said first and second openings and at said third opening causes water to inlet through said inlet tube and into said casing to thereby maintain said blades submerged and accordingly primed.

3,970,028

VESSEL MOORING SYSTEM

Yoichi Motai, Urawa; Keijiro Gouda, Chofu, and Atsuya Isono, Tokyo, all of Japan, assignors to Nippon Oil Company Ltd. and Miwa Shokai Company, Ltd., both of Tokyo, Japan

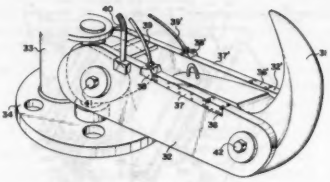
Filed Dec. 23, 1974, Ser. No. 535,570

Int. Cl.² B63B *21/16*

U.S. Cl. 114—230 **10 Claims**

1. A system for mooring a vessel to a facility on a wharf or pier, said system comprising a plurality of mooring means, tensional force detecting means comprising a strain gauge incorporated in each said mooring means, said detecting means including means for generating a tension signal and

means for adjusting the tensional force exerted on said respective mooring means in accordance with the signals generated by said detecting means whereby the vessel is moored to the facility in a well balanced condition, said mooring means further comprising a plurality of fixing means rigidly secured to the mooring facility, at least one hook formed on each said fixing means, a plurality of ropes each having one end connected to said hook, and a winch which is provided on board said vessel and to which the other end of said ropes are connected, there being further provided a conductor connected to said strain gauge and indicator means connected to said conductor, there being still further provided a notched, covered frame plate pivotally supporting each said hook, said conductor and said strain gauge being positioned within said notch.

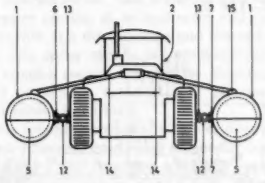


3,970,029

EARTH MOVING MACHINERY MADE AMPHIBIOUS

Gilbert Abel Bibaut, 22, rue de Compiegne, 60880 Le Meux, France

Filed Aug. 7, 1974, Ser. No. 495,372
Claims priority, application France, Aug. 9, 1973, 73.29469
Int. Cl.² B60F *3/00*
U.S. Cl. 115—1 R **7 Claims**



1. Apparatus for making amphibious a dry-land earth moving machine which is inherently incapable of supporting itself on water, said apparatus comprising

at least two tubular, water-tight elements adapted to be positioned on either side of said machine;

detachable coupling means between said machine and each of said tubular elements; and

means for controlling the elevation of said elements relative to the machine,

said elements being constructed to be of substantially unchanging interior volume and to make the machine capable of supporting itself on water,

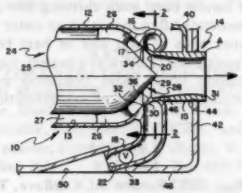
said detachable coupling means comprising substantially vertical ears protruding from the elements toward the machine and mating with substantially vertical ears protruding from the machine toward the elements and removable pins for joining the ears for pivotal movement of the elements about substantially horizontal axes defined by the pins.

3,970,030

INTERNAL THRUST REVERSER

Maynard L. Stangeland, Calabasas, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Sept. 25, 1975, Ser. No. 616,748
Int. Cl.² B63H *11/10*
U.S. Cl. 115—12 R **6 Claims**



1. An internal thrust reverser for waterjet driven craft comprising:

an outer housing member having a concentric inner pintle body spaced from said outer housing, said pintle body being supported by two or more flow straightener vanes downstream of an inducer pump, said vanes being equidistantly positioned and radially disposed between an inner wall of said outer housing and an outer wall of said pintle, said inner and outer wall forming an annular chamber therebetween, said pintle body terminating in a cone-shaped end downstream of said flow straighteners,

a collector volute connected to said outer housing, said volute having at least one reversing conduit attached thereto, said volute is positioned downstream of said flow straightener vanes, said volute being substantially radially disposed with respect to a longitudinal axis of said pump, said volute forming an inwardly facing opening which communicates with said annular chamber,

a movable nozzle member is positioned adjacent said collector volute, said movable nozzle member is axially slidable within said outer housing member, a first upstream end of said nozzle member having an end face, the surface of said end face mates with said cone-shaped end of said inner concentric pintle body, when said movable nozzle member is positioned in a forward reverse thrust position fluid flow is blocked from entering said nozzle and diverted through said opening in said volute into said reversing duct to reverse said watercraft, said first upstream end further forming a peripheral sealing lip that closes off said opening in said volute when said movable nozzle is positioned in a rearward forward thrust position, thus diverting all of the fluid through said nozzle, and

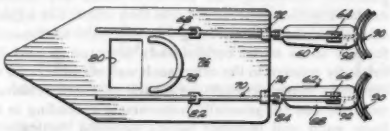
means to axially manipulate said movable nozzle.

3,970,031

FLOATING OARS

Charles K. Vrana, 60 Helen Lane, Fort Myers Beach, Fla. 33931

Continuation-in-part of Ser. No. 488,248, July 12, 1974, abandoned. This application Apr. 7, 1975, Ser. No. 565,742
Int. Cl.² B63H *16/00*
U.S. Cl. 115—21 **6 Claims**



1. A floating oar device for propelling a person through the water comprising handle bar means, a floatation pad fixed

relative to each outer end of said handle bar means, flap means pivotally connected along their upper edges relative to bottom surfaces of the respective floatation pads whereby said flap means alternately pivot downwardly and upwardly to substantially vertical and horizontal positions relative to respective rearward and forward movement of said floatation pads along the surface of the water, and means to limit said downward pivotal movement, said handle bar means comprises a pair of handle bars, each carrying one of said floatation pads and associated flap means on an outer extended end thereof, the inner ends of said pair of bars being operably restrained and positioned relative to a person, supported on an elongated floatation board, said floatation pads and flap means being located rearwardly of said floatation board.

3,970,032

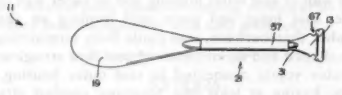
PADDLE

Wayne R. Phillips, 8537 Second St., Cordova, Tenn. 38018

Continuation-in-part of Ser. No. 450,991, March 13, 1974, abandoned, which is a continuation-in-part of Ser. No. 365,040, June 20, 1973, abandoned. This application Dec. 9, 1974, Ser. No. 530,529

Int. Cl.[2] B63H *16/04*

U.S. Cl. 115—24.1 **14 Claims**



1. A paddle for manually propelling waterborne craft, said paddle comprising a grip member establishing the upper end of said paddle and having major and minor axes thereto, a blade member establishing the lower end of said paddle, an elongated intermediate member having said grip member attached to the upper end thereof with said blade member being attached to the lower end thereof, pivot means coextending with the longitudinal axis of said paddle and being attached to said elongated intermediate member for providing pivotal movement of said grip member relative to said blade member whereby the major axis of said grip member may selectively be angularly aligned and disaligned with the plane of said blade member, and quick release locking means for selectively locking said grip member relative to said blade member in any one of several discrete predetermined positions while the craft is being propelled with said paddle.

3,970,033

PORTABLE REFLECTOR DEVICE

Henry Lindner, Woodale, and James D. Kennedy, Streamwood, both of Ill., assignors to Beatrice Foods Company, Elgin, Ill.

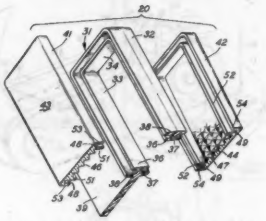
Continuation-in-part of Ser. No. 351,308, April 16, 1973, abandoned. This application Feb. 4, 1974, Ser. No. 439,045

Int. Cl.[2] E01F *9/10*; G09F *1/10*

U.S. Cl. 116—63 P **15 Claims**

1. A construction for a display device, reflector, or the like comprising:

A. a closed loop of material comprising a pair of spaced, parallelly extending wall members which are interconnected together generally across their respective adjacent midregions by a connecting rib, one said wall member formed so as to be continuously oriented in said loop inwardly relative to the other such wall member, said wall members being generally vertically oriented relative to said rib, said rib generally transversely extending in said loop, each wall member having opposed vertically extending spaced edge portions with the inward wall member shorter in length than the other wall member B. a pair of plate-like members with each plate-like member adapted to have display, reflector, elements and the like incorporated therein, each said plate-like member having an outside face and an inside face, each inside face having a channel defined therein adjacent the perimeter thereof, each said plate-like member being adapted to fit in mating engagement over a different one of the opposed edge portions of said inwardly oriented wall member of said closed loop with said channel thereof receiving said edge



portions and with the perimeter portion near to portions of said other wall member, each said plate-like member furthr having upstanding shoulder portions circumferentially projecting about inside edge portions of said channel from said inside face, said respective shoulder portions of each plate-like member being adated to abut against one another for bonding when said plate-like members are each so matingly engaged over said opposed edge portions.

3,970,034

PISTON POSITION SENSING DEVICE

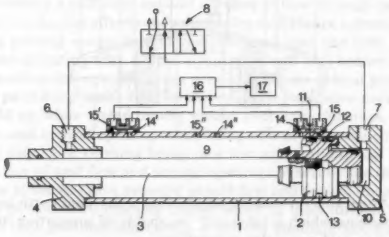
Colin John Kirk, Twickenham, England, assignor to Martonair Limited, Twickenham, England

Filed Feb. 27, 1975, Ser. No. 553,742

Claims priority, application United Kingdom, Mar. 9, 1974, 10635/74

Int. Cl.[2] G01D *5/42*; G09F *9/00*

U.S. Cl. 116—124 D **9 Claims**



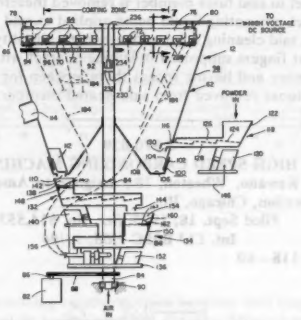
1. A sensing device for sensing the position of a movable element in a fluid-operable actuator including a relatively movable piston and cylinder comprising a pair of co-pending pressure tappings in the peripheral wall of said cylinder, a pair of seals on the piston for sealing between the piston and the peripheral wall of said cylinder and spaced apart in the directions of said relative movement, the spacing of said pressure tappings being greater than the width of each of said seals in the directions of said relative movement and less than the distance between said seals in the directions of said relative movement, detector means responsive to the pressure at each said pressure tapping to give an output of magnitude determined by the position of said seals with respect to said pressure tappings and hence the position of said piston in said cylinder and indicator means to which said output is applied to indicate the position of said piston.

3,970,035

POWDER DEPOSITION SYSTEM

Lennox Birckhead, Jr., Rowayton, Conn., assignor to Vitek Research Corporation, Stamford, Conn.

Division of Ser. No. 210,723, Dec. 22, 1971, Pat. No. 3,777,874. This application Nov. 20, 1973, Ser. No. 417,633
Int. Cl.[2] B05C 5/00
U.S. Cl. 118—7 3 Claims



1. An apparatus for forming a particulate layer on a substrate surface from a gaseous suspension of particulate, thermoplastic material, said apparatus comprising:

A. classifying means for removing from a supply of particulate, thermoplastic material substantially all particulate material above a predetermined size which will inhibit the formation of a substantially continuous and uniform layer of particulate material on said substrate surface, and for directing from said supply of particulate, thermoplastic material to a metering feed means properly-sized particulate material from which a substantially continuous and uniform layer of particulate material can be formed on said substrate surface;

B. metering feed means for feeding said properly-sized particulate material at a controlled volumetric rate to delivery conduit means, said metering feed means including a hopper section at an upstream end thereof and a trough section at a downstream end thereof;

C. at least one spray means in communication with said delivery conduit means disposed for directing said properly-sized particulate material in a gaseous suspension onto said substrate surface,

1. movable retaining means to which said spray means are secured, substrate conveying means for conveying said substrate in a first direction and drive means for moving said retaining means along a path, at least a portion of which passes in a second direction substantially transverse to said first direction past the substrate surface upon which said particulate layer is to be formed,

2. said movable retaining means for said spray means being in the form of a closed loop, said movable retaining means further including a rotatably mounted support member for said metering feed means, and means for rotating said support means and for moving said retaining means through said closed loop in synchronism to prevent twisting of said delivery conduit means,

3. a housing in which said movable retaining means is disposed, at least a portion of said housing being rotatably mounted, said delivery conduit means extending through said rotatable portion of said housing, said drive means moving said rotatable portion of said housing in synchronism with said retaining means and said support member to prevent twisting of said delivery conduit means;

D. control circuit means for controlling the operation of said classifying means to direct properly-sized particulate material from said classifying means into said hopper section when said control circuit means is energized; and

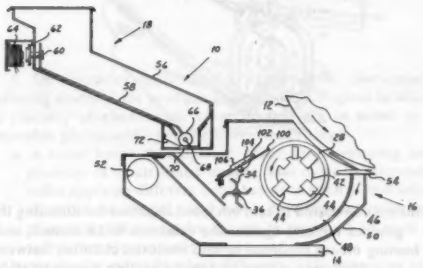
E. pressure responsive sensing means operably associated with said control circuit means for energizing said control circuit means when the particulate material in said hopper section is below a predetermined amount, and for de-energizing said control circuit means when said predetermined amount of properly-sized particulate material is disposed within said hopper section.

3,970,036

TONER CONCENTRATION DETECTOR FOR DRY POWDER MAGNETIC BRUSH TONING SYSTEM

James A. Baer, Menlo Park; Charles B. Clark, Los Altos, and Louis F. Schaefer, Palo Alto, all of Calif., assignors to Savin Business Machines Corporation, Valhalla, N.Y.

Filed July 17, 1974, Ser. No. 489,389
Int. Cl.[2] G03G 15/08
U.S. Cl. 118—7 17 Claims



1. In an electrostatic copier having a member carrying a photoconductor adapted to receive a latent electrostatic image and a developer applicator for applying a developer made up of a mixture of toner particles and ferromagnetic carrier particles to said photoconductor to develop said image, a system for replenishing the toner in said developer including in combination, a supply of developer adapted to be applied to said photoconductor by said applicator, an elongated generally tubular conduit having an inlet and an outlet, means for carrying developer from said applicator to said inlet to cause developer to flow through said conduit from said inlet to said outlet, said conduit having a certain cross-sectional area immediately ahead of said outlet, means forming a restricted opening of a cross-sectional area substantially less than said certain area adjacent to said outlet for inhibiting unstable flow of said developer through said conduit, a winding carried by said conduit, means for measuring changes in the inductance of said winding, a supply of toner, and means responsive to said measuring means for feeding toner from said toner supply to said developer supply.

3,970,037

COATING COMPOSITION VAPORIZER

John F. Sopko, Plum Borough, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

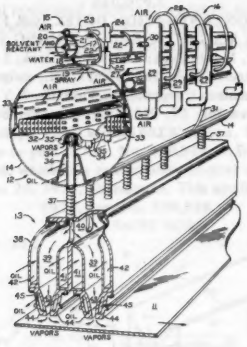
Division of Ser. No. 315,395, Dec. 15, 1972, abandoned. This application Dec. 17, 1974, Ser. No. 533,609
Int. Cl.[2] C23C 13/12
U.S. Cl. 118—48 5 Claims

1. Apparatus for applying a coating to a substrate, comprising:

an enclosed chamber;

means for spraying a vaporizable coating reactant into said enclosed chamber in a first direction at a temperature below its vaporization temperature;

means for (1) moving a stream of carrier gas into said enclosed chamber in a second direction intersecting the first direction of the coating reactant and (2) heating the carrier gas to a temperature above the vaporization temperature of the coating reactant and below the decomposition temperature of the coating reactant to mix the coating reactant with the carrier gas and vaporize the coating reactant by the heat of the carrier gas to form a gaseous mixture;



means connected to said enclosed chamber for directing the gaseous mixture against the substrate to be coated, and

heating means mounted in said enclosed chamber between said dispersing means and said directing means to stabilize the temperature of the gaseous mixture passing therethrough, said heating means having sufficient heat capacity to heat a cooler mixture and to cool a hotter mixture to the temperature of said heating means while maintaining the temperature of said heating means substantially unchanged.

3,970,038

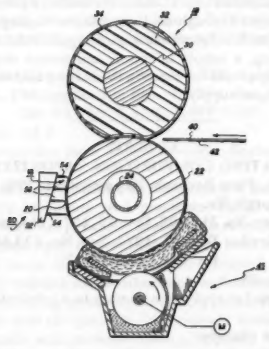
ROLL FUSER

Raghulinga R. Thettu, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Jan. 2, 1975, Ser. No. 537,991

Int. Cl.² G03G *15/20*

U.S. Cl. 118—60 **10 Claims**



1. In a contact fuser for fixing toner images to substrates, in combination:

a heated fuser member;

a backup member cooperating with said heated fuser member to form a nip through which said substrates pass to thereby soften toner images;

wick means for applying offset preventing liquid to said heated fuser member; and

cleaning means contacting one of said members for removing toner offset thereto, said cleaning means being disclosed intermediate said nip and said wick such that toner offset to said fuser member is removed therefrom prior to offset preventing liquid being applied to said fuser member, said cleaning means comprising a plurality of spaced-apart fingers supported in wiping contact with said fuser member and having spaces therebetween for accumulating toner removed from said heated member.

3,970,039

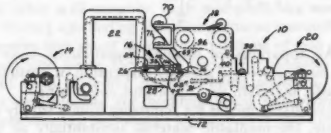
HIGH SPEED CARBONIZING MACHINE

Mak S. Kawano, Wheaton, Ill., assignor to American Tara Corporation, Chicago, Ill.

Filed Sept. 18, 1975, Ser. No. 614,553

Int. Cl.² B05C *1/08, 11/04*

U.S. Cl. 118—60 **13 Claims**



1. In apparatus for coating tissue paper webs of the type including a coating roller for applying a hot liquid coating to the web and chilling rollers to solidify the coating, the improvement comprising: metering rod means for controlling the ink thickness on the coating roller, first doctor blade means positioned downstream of the coating roller and metering rod for lightly contacting the web for removing portions of the coating which exceed a predetermined thickness; second doctor blade means positioned downstream of said first doctor blade means for removing additional portions of said coating; an equalizer rod positioned for rotation about its axis downstream of the second doctor blade means, said equalizer rod having a diameter of less than 0.100 inches; and means for guiding the web to and from the equalizer rod so that the web changes its direction as it passes over the equalizer rod.

3,970,040

COATING TRAY

Frank L. Porth, Morley, Mich., assignor to James A. Black, Kent City, Mich.

Continuation of Ser. No. 341,486, March 15, 1973, abandoned. This application Apr. 23, 1975, Ser. No. 570,735

Int. Cl.² B05C *11/04*

U.S. Cl. 118—406 **7 Claims**

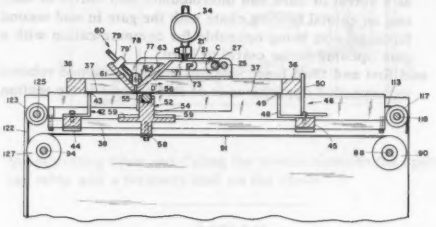
1. A coating system for applying a uniform coat of fluid to planar stock material, said system comprising:

means for holding planar stock;

a tray comprising a generally V-shaped trough with end walls defining a reservoir for fluid and including a plurality of apertures formed through the bottom apex of said trough and spaced along at least a portion of the length of the tray wherein said tray includes a channel formed in the apex of said trough on the exterior thereof and in communication with said apertures, said channel being defined by a continuous spreading blade extending adjacent said apertures and a second blade wherein said blades span said apertures and extend the length of said channel and wherein said apertures are separated by lands having side walls tapered inwardly toward adjacent apertures in a direction toward said channel to facilitate

the uniform filling of said channel with fluid from said trough;

means for mounting said tray with respect to planar stock held by said holding means such that said blade is spaced a predetermined distance from the surface of such stock; and



means providing relative motion between said tray and the stock while maintaining the distance between said blade and the stock relatively constant to apply a uniform thickness coat of fluid to the stock wherein said mounting means causes said tray to be pivotally coupled to said providing means such that said second blade of said tray rests upon the surface of the planar stock and said spreading blade is adjustably spaced from the surface of the stock.

3,970,041

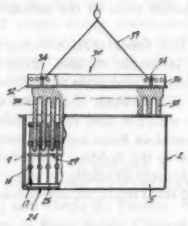
APPARATUS FOR DEPOSITING FIBROUS DIAPHRAGMS

Morton S. Kircher, Oakville, Canada, assignor to Olin Corporation, New Haven, Conn.

Filed Apr. 2, 1975, Ser. No. 564,967

Int. Cl.² B05C *3/02*

U.S. Cl. 118—428 **11 Claims**



1. Apparatus for depositing a fibrous diaphram on a plurality of electrodes having foraminous surfaces comprising a tank for holding a slurry of fibrous material having a bottom and walls and having dividing means for separating said electrodes from each other and removably secured to one of said walls, said means comprising pluralities of rod elements; each plurality of rods lying in a substantially vertical plane spaced from another such plane; and roller means disposed on said rod elements whereby said dividing means functions to maintain said electrodes, when immersed, spaced apart and to inhibit abrasion thereon.

3,970,042

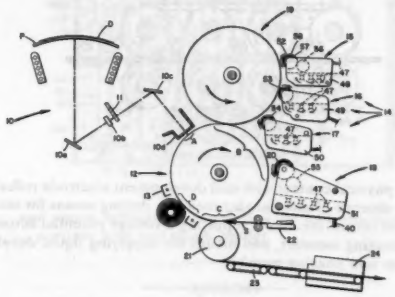
COLOR DEVELOPMENT APPARATUS

James D. Rees, Pittsford, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Jan. 17, 1975, Ser. No. 541,773

Int. Cl.² G03G *15/01, 15/08*

U.S. Cl. 118—637 **8 Claims**



1. Development apparatus for a multi-color electrostatic printing machine for producing copies of an original in which a plurality of electrostatic latent images are in series on a movable photoconductive member, comprising:

a. a color toner development roller for developing said plurality of electrostatic images, said color development roller applying different color toners to each of said latent electrostatic images, said color development roller applies said different color toners in sequence to each of said latent electrostatic images; and

b. means for providing said different color toners on said color development roller, said means for providing provides each of said color toners onto a different area of the color development roller, said means for providing provides one color toner to the same area of the color development roller, this area to which the one color toner is provided being spaced from another area of said color development roller on which another color toner is provided, said color development roller having sequential areas of color toner thereon, said means for providing includes a plurality of color toner donor apparatus, each applying a different color toner to the color development roller and spaced about the periphery of the color development roller, said donor apparatus are movable and further comprising means for sequentially moving each of said color toner donor apparatus into and out of contact with said color development roller to provide said roller with the color toner. Said means for sequentially moving includes a plurality of cams, one for each of said color toner donor apparatus and located on the periphery of the color development roller; and a plurality of cam followers, one for each of said cams and connected to said donor apparatus.

3,970,043

ELECTROPHOTOGRAPHIC DEVICE FOR LIQUID DEVELOPMENT

Masamichi Sato, and Shigeru Tezuka, both of Tokyo, Japan, assignors to Xerox Corporation, Stamford, Conn.

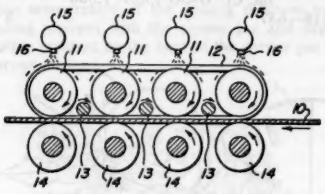
Division of Ser. No. 370,908, June 18, 1973, Pat. No. 3,870,514. This application Oct. 7, 1974, Ser. No. 512,382

Int. Cl.² G03G *13/10*

U.S. Cl. 118—637 **4 Claims**

1. An electrophotographic device for liquid development of an imaging member comprising support rollers for said imaging member, development electrode rollers positioned opposite the image bearing surface of said imaging member, said

development electrode rollers having an endless belt mounted thereon, said support rollers having grooves therein at each end thereof, said grooves facing and aligned with grooves in the development electrode rollers so that said support rollers



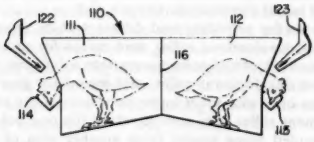
are in physical contact with said development electrode rollers in the absence of said imaging member, driving means for said support rollers, means for supplying a voltage potential across said imaging member, and means for supplying liquid developer to said imaging member.

3,970,044

CONTROLLED FEEDING OF LIVESTOCK

William S. Peppler, New York, N.Y.; Everett M. Keen, and Anthony J. Siciliano, both of Vineland, N.J., assignors to Diamond International Corporation, New York, N.Y.

Filed Aug. 29, 1974, Ser. No. 501,835
Int. Cl.² A01K *5/02*
U.S. Cl. 119—18 **10 Claims**



1. Method of feeding poultry comprising the steps of:

a. confining matured size poultry of about five birds in each group of two or more groups with each of said groups being in separate cage units having separate feed receptacles of which each feed receptacle has a width of about 15 inches accessible to feed the poultry;

b. accurately measuring and dispensing feed at the rate of approximately 1 ounce per 15 inches of each of said feed receptacle in a first feed period;

c. repeating the step of accurately measuring and dispensing feed at the rate of approximaterly 1 ounce per 15 inches of each of said feed receptacle over from about three to 19 additional feed periods at generally regular intervals each day.

3,970,045

PORTABLE ANIMAL PEN AND GATE STRUCTURE

Joseph A. Graham, Jr., Milo, Iowa 50166

Filed May 7, 1975, Ser. No. 575,430
Int. Cl.² A01K *29/00*
U.S. Cl. 119—20 **8 Claims**

1. A knockdown portable animal pen structure for use intermediate an animal enclosure such as a corral or barn and a holding chute in which an animal is restrained to be administered various treatments, said pen structure comprising:

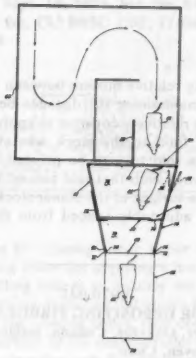
first, second and third rectangular fence sections defining suitable barrier members with respective top, bottom and opposed ends,

fastening means carried by the respective ends of said respective sections for removable interlocking hinged engagement with each other,

a respective latchable gate within the confines of said first and second fence sections,

the respective ends of said second fence section being hingedly engaged to a respective end of said first and third fence sections so that said second fence section is disposed immediately adjacent an animal enclosure such as a corral or barn and intermediate said corral or barn and an animal holding chute with the gate in said second fence section being openable for communication with a gate opening in the corral or barn,

said first and third fence sections being positioned relative to respective opposite ends of said second fence section



in a converging relationship towards the holding chute and with said fastening means on said other ends of said first and third fence sections being removably attached to respective opposite sides of the entrance to the holding chute, and

the gate in said first fence section being movable towards and operably latchable to said third fence section to establish first and second pens or enclosures intermediate and in direct line beween the corral or barn and said holding chute wherein said first enclosure is accessible only to the corral or barn and said second enclosure is accessible only to the holding chute but with access between the enclosures available by movement of said gate away from said third fence section towards said first fence section.

3,970,046

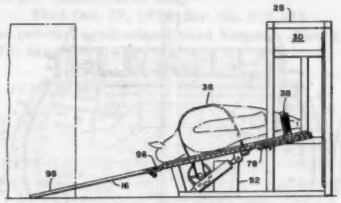
VETERINARY SURGICAL METHOD

George L. Boggs, 2507 W. Hibbard, Rte. 5, Owosso, Mich. 48867

Filed Apr. 18, 1974, Ser. No. 461,863
Int. Cl.² A61D *3/00*
U.S. Cl. 119—103 **4 Claims**

1. The method of moving a large animal before and after operating on the animal comprising securing the animal in a standing position to a vertically positioned operating table, tilting the operating table to a horizontal position for performing an operation on the animal, further tilting the operating

table in the same direction approximately 15° to permit sliding of the animal from the operating table, attaching a chute to



the operating table and sliding the animal between the operating table and a recovery stall on the chute.

3,970,047

REDUCED PRESSURE TYPE STEAM GENERATOR

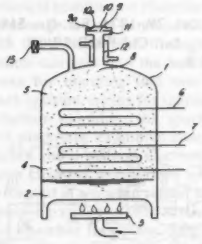
Sadakazu Yamada, Kyoto, Japan, assignor to Stotz & Co. AG, Zurich, Switzerland

Filed Mar. 17, 1975, Ser. No. 559,371

Claims priority, application Japan, Mar. 18, 1974, 49-31192

Int. Cl.² F22B *5/00*

U.S. Cl. 122—13 R **5 Claims**



1. A reduced pressure type steam generator comrising a vessel containing therein an air tight steam chamber, the interior of said vessel being maintained at reduced atmospheric pressure, a heatable liquid medium enclosed in the vessel, a gas reservoir connected with the top region of the vessel, said gas reservoir being equipped with an outlet covered with a polymer film for permeating out any non-condensible gas formed in the vessel.

3,970,048

LOW PRESSURE STEAM GENERATOR

John F. Finger, and Merle E. Pachop, both of Beresford, S. Dak., assignors to Sioux Steam Cleaner Corporation, Beresford, S. Dak.

Filed Mar. 6, 1975, Ser. No. 555,810

Int. Cl.² F22B *21/22*

U.S. Cl. 122—328 **5 Claims**

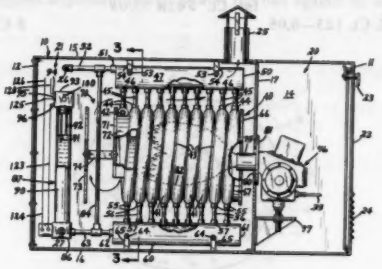
1. In a low pressure steam generator:

a water tube structure comprising a plurality of generally annular portions slightly spaced from one another along a common horizontal axis to define a hollow laterally discontinuous combustion chamber;

an elongated water header having an axis parallel to said common axis and located below said water tube structure;

means individually connecting the bottoms of said annular portions with said water header;

an elongated steam header having an axis parallel to said common axis and located above said water tube structure;



and means individually connecting the tops of said annular portions with said steam header.

3,970,049

IGNITION SYSTEM FOR ROTARY PISTON ENGINE

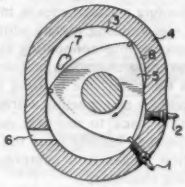
Shunzo Yamaguchi, Nishio; Toshihiko Igashira, Toyokawa, and Masami Hujita, Okazaki, all of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Filed June 4, 1974, Ser. No. 476,273

Claims priority, application Japan, June 5, 1973, 48-66701[U]; June 7, 1973, 48-67229[U]

Int. Cl.² F02B *53/04*

U.S. Cl. 123—8.05 **4 Claims**



1. An ignition system for a rotary piston engine comprising:

a rotor;

a rotor housing in which said rotor is mounted to contact with the walls thereof;

first and second sparking means, said first sparking means being positioned in said rotor housing proximate a forward end of a combustion chamber in the direction of rotation of said rotor wherein the combustion chamber is defined by said rotor and said rotor housing when said rotor is at a top dead center, said second sparking means being positioned in said rotor housing at the rear of the position of said first sparking means relative to said combustion chamber in the direction of rotation of said rotor, both said first and second sparking means being positioned on a forward side of the short axis of said rotor housing in the direction of rotation of said rotor;

a speed sensor for detecting the rotational speed of said engine;

a vacuum sensor for detecting the vacuum in the intake manifold of said engine; and

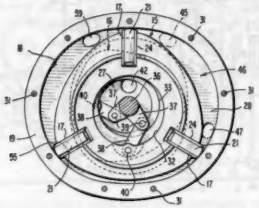
switching means responsive to the output of said speed sensor and said vacuum sensor for coupling current to said second sparking means only when said engine goes into high speed operation and/or high load operation, and for coupling current to only said first sparking means under other conditions of said engine.

3,970,050

TWO-STAGE ROTARY ENGINES

Harry W. Hoadley, 139 Laquineo St., Findlay, Ohio 45840

Filed Mar. 7, 1975, Ser. No. 556,433
Int. Cl.² F02B 53/08
U.S. Cl. 123—8.05 5 Claims



1. A rotary engine comprising a two-stage housing means having first and second stage variable volume oblong working chambers whose major axes are substantially perpendicular, first and second stage three-sided rotors movably mounted in said first and second stage working chambers, a single engine output shaft journaled on said housing means for rotation and having cranks adjacent the first and second stage working chambers which are spaced apart substantially ninety degrees circumferentially, connecting links pivotally interconnecting said cranks and rotors in said first and second stage working chambers, spaced seals carried by said rotors and having wiping engagement with peripheral and side walls of said first and second stage working chambers, said rotors having communicating central cooling passage means, said housing means having a fuel intake passage communicating with the rotor cooling passage means and having a delivery passage for fuel leading from the cooling passage means into the first stage working chamber, said housing means additionally having a charge transport passage interconnecting said first stage and said second stage working chambers and delivering a charge from the former to the latter, the housing means having another delivery passage for transporting a fired charge from the second stage chamber back to the first stage chamber and having an exhaust passage leading from the first stage chamber, and fuel ignition means in a compression zone of the second stage working chamber.

3,970,051

ROTARY ENGINE DEVICE

Thomas E. Kirkman, R.R. 2, Box 342, Odon, Ind. 47562

Filed May 2, 1975, Ser. No. 573,928
Int. Cl.² F02B 53/00, 53/10
U.S. Cl. 123—8.09 11 Claims

1. A rotary engine device comprising:

a housing having means defining an axis and means defining side walls of a chamber, said side walls being opposed, axially spaced parallel walls extending oblique to and around said axis;

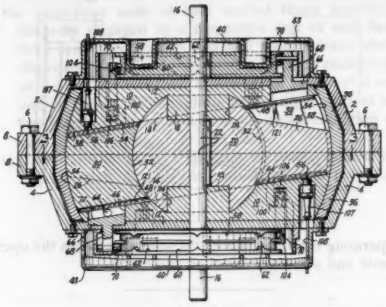
a rotor journalled in said housing for rotation about said axis, said rotor having a spherical portion spanning the space between said side walls and defining the radially inner surface of said chamber;

a circumferential web fixed to said spherical portion and extending radially of said axis between said side walls;

a ring fixedly mounted on the outer edge of said web to rotate therewith and having a spherical inner surface, concentric to said spherical portion, and completely spanning the space between said side walls, throughout the periphery thereof, to define the radially outer surface of said chamber;

a plurality of radial slots extending axially through said web;

a vane axially slidable in each of said slots and having edges complementary to and slidably engaging said side walls and said radially inner and outer surfaces of said chamber to divide said chamber, on each side of said web, into variable volume compartments; and



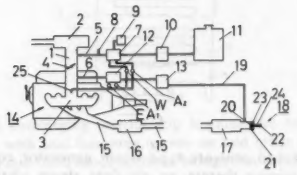
fluid inlet and outlet ports in said housing arranged to successively communicate with each of said compartments as said rotor and vanes rotate in said housing.

3,970,052

APPARATUS FOR CONTROLLING NOXIOUS EXHAUST GASES FROM INTERNAL-COMBUSTION ENGINE

Akira Andoh, Yokohama, Japan, assignor to Clemix Co., Tokyo, Japan

Filed Oct. 29, 1974, Ser. No. 518,937
Int. Cl.² F02D 19/00
U.S. Cl. 123—25 R 10 Claims



1. An apparatus for minimizing the amount of noxious gases such as nitrogen oxides, carbon monoxides and hydrocarbons contained in the exhaust gases to be produced by burning fuel in an internal-combustion engine, comprising a conduit leading to a combustion chamber of the engine for the supply of air-fuel mixture to said combustion chamber and provided with throttle valve means therein, two branch pipes extending from said conduit and located on opposite sides of said throttle valve means, respectively a first control section connected to one of said two branch pipes and operative for selectively controlling the supply of water and air to said combustion chamber, a second control section connected to the other of said two branch pipes and operative for controlling the supply of part of said exhaust gases and air to said combustion chamber for reburning said part of said exhaust gases and said air therein, a distribution pipe for the supply of the amount of said water and said air supplied by said first control section and for the supply of the amount said part of said exhaust gases and said air supplied by said control section and having one end thereof present inside said conduit or intake manifold connected to said conduit, and control elements provided in said first control section and actuated in response to changes in pressures within said first control section said second control section for controlling the flow of said water, air and exhaust gases.

3,970,053

INTERNAL COMBUSTION ENGINES

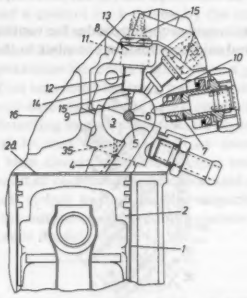
Charles Lindsay Goodacre, London, England, assignor to Fiat Societa per Azioni, Turin, Italy

Filed Oct. 25, 1974, Ser. No. 518,118

Claims priority, application United Kingdom, Nov. 5, 1973, 51181/73; May 2, 1974, 19347/74

Int. Cl.² F02B 3/02

U.S. Cl. 123—30 D 21 Claims



1. A internal combustion engine comprising at least one cylinder, a piston reciprocable in the cylinder, means for admitting air into said cylinder for compression by the piston, a substantially spherical combustion chamber externally of the cylinder, transfer passage means communicating the combustion chamber with the cylinder and through which air compressed by the piston can pass into the combustion chamber, fuel injector means for injecting fuel into the combustion chamber, and spark ignition means for igniting a fuel/air mixture in the combustion chamber, the spark ignition means comprising a first electrode extending diametrically of the combustion chamber and a second electrode which extends into the combustion chamber and defines with said first electrode a spark gap located in a central region of the combustion chamber, said transfer passage means extending tangentially of the combustion chamber in a plane perpendicular to said first electrode whereby air compressed by the piston and transferred to the combustion chamber will be caused to rotate within the combustion chamber about the axis provided by said first electrode.

3,970,054

INTERNAL COMBUSTION ENGINE FED WITH A STRATIFIED DOUBLE CHARGE

Claude Henault, Chevilly Larue, and Pierre Cochard, Saint Germain les Arpajon, both of France, assignors to Regie Nationale des Usines Renault, Boulogne-Billancourt and Automobiles Peugeot, Paris, both of, France

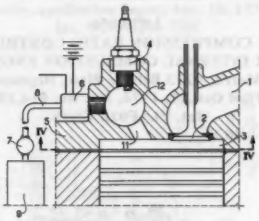
Filed Feb. 20, 1975, Ser. No. 551,415

Claims priority, application France, Feb. 21, 1974, 74.06010; Sept. 17, 1974, 74.31408

Int. Cl.² F02B 19/10, 19/16

U.S. Cl. 123—32 ST 2 Claims

1. An internal-combustion engine fed with a stratified charge comprising means for injecting into a combustion chamber a main charge of a lean mixture of a first fuel and air, and an injection device, for injecting a second fuel into an ignition zone of the combustion chamber, comprising an injector holder and an injector mounted on said injector holder, said holder comprising a retaining element defining a fluid passage in said holder, a seat opposite said retaining element and a ball valve including a ball freely mounted with a given degree of clearance for movement between said retaining element and said seat, said retaining element being disposed in said holder closer to the combustion chamber, while said seat is integral with the holder and disposed closer to the injector such that the pressure in the combustion chamber at the end of the compression stroke and during ignition and the subsequent expansion stroke pushes the ball against its seat,



thereby protecting the injector, with the retaining element being a baffle plate having two opposite flat lateral portions which define said fluid passage and said baffle plate being press-fitted in a bore in the injector holder.

3,970,055

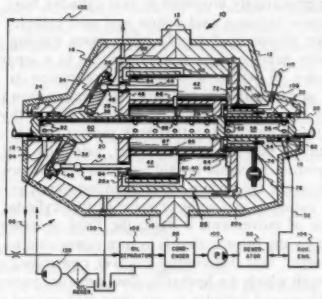
UNIFLOW-TYPE EXTERNAL COMBUSTION ENGINE FEATURING DOUBLE EXPANSION AND ROTARY DRIVE

Otto V. Long, 3440 SW. Veterans Hospital Road, Portland, Oreg. 97201

Filed May 17, 1974, Ser. No. 470,820

Int. Cl.² F02B 57/06

U.S. Cl. 123—43 A 13 Claims



1. Engine apparatus of the type having at least one cylinder in which a piston reciprocates, said cylinder defining respective chambers located at first and second ends of said cylinder on either side of said piston, wherein the improvement comprises:

a. means defining an exhaust port in the wall of said cylinder adjacent the center thereof positioned so as to be exposed to the interior of said cylinder when said piston is adjacent the first end of said cylinder and blocked by said piston when said piston is adjacent the second end of said cylinder;

b. means defining a transfer port in the wall of said cylinder adjacent the center thereof separate from said exhaust port and positioned so as to be exposed to the interior of said cylinder when said piston is adjacent said second end and blocking said exhaust port;

c. means defining an inlet port in the wall of said cylinder adjacent said second end thereof and positioned so as to communicate with the interior of said cylinder when said piston is adjacent said second end and blocking said exhaust port; and

d. means defining a transfer passageway joining said transfer port and said inlet port for selectively transferring gas

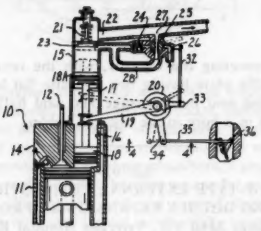
from said chamber at said first end of said cylinder to said chamber at said second end of said cylinder when said piston is adjacent said second end and blocking said exhaust port.

3,970,056

VARIABLE COMPRESSION RATIO CONTROL SYSTEM FOR INTERNAL COMBUSTION ENGINES

Kenneth B. Morris, 4213 Belmar Blvd., Neptune, N.J. 07753

Filed Oct. 11, 1974, Ser. No. 514,105
Int. Cl.² F02B *75/36*
U.S. Cl. 123—48 D **6 Claims**



1. A variable compression ratio internal combustion engine controlled by a throttle comprising, a main cylinder block with a cylinder bore and a cylinder head over said cylinder bore, a piston reciprocatingly mounted in said cylinder bore, a combustion space between said piston and said cylinder head, a passage for compressed combustible gases passing through said cylinder head, said passage connected to a separate second cylinder in which a first auxiliary piston is slidably mounted, said auxiliary piston supported on a piston rod, said piston rod extending to a second auxiliary piston that is also reciprocatingly mounted so that both pistons float in opposed relationship in said separate cylinder, said first and second auxiliary pistons movable in said separate cylinder away from said combustion area when there is an increased pressure in said main cylinder, and a check valve in said cylinder to limit the degree of movement, a hydraulic fluid pressure system controlled by the throttle that is in turn connected to a differential resolver, said differential resolver controlling a rotary valve through which the hydraulic fluid pressure passes to one end of said second cylinder to act upon said second auxiliary piston, said fluid pressure acting upon the second auxiliary piston producing a floating motion of both first and second auxiliary pistons between a maximum compression and a minimum compression to in turn vary the position of the first auxiliary piston and in turn vary the compression in the combustion area, said second cylinder having a stop at one end to limit the movement of said first auxiliary piston when said combustion area of said main cylinder is exhausted of its pressure charge.

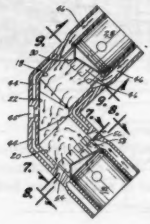
3,970,057

INTERNAL COMBUSTION ENGINE

George A. Schauer, 2023 Kellogg Ave., Ames, Iowa 50010

Filed June 14, 1973, Ser. No. 370,165
Int. Cl.² F02B *25/08, 75/28*
U.S. Cl. 123—51 BA **4 Claims**

1. Internal combustion engine comprising:
a housing having first and second cylinders, a combustion chamber, and two crankcases,
said cylinders each having first ends positioned adjacent one another, and second ends positioned adjacent one of said crankcases, said combustion chamber being between said first ends of said cylinders;
first and second pistons slidably mounted in said first and second cylinders respectively for reciprocating movement therein;
crankshaft means within said crankcases;
means interconnecting said pistons with said crankshaft means for transferring said reciprocating movement of said pistons into rotational movement of said crankshaft means;
first inlet ports arranged in a full circular array around the circumference of said first cylinder for charging said first cylinder whenever said first piston is in a predetermined position;
exhaust ports in said second cylinder for venting said second cylinder and said combustion chamber to the atmosphere



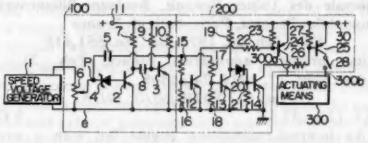
whenever said second piston is in a predetermined position within said second cylinder;
second inlet ports in said second cylinder for charging and scavenging said second cylinder while said exhaust ports are open;
said exhaust ports being arranged in a full circular array around the circumference of said second cylinder;
said second inlet ports being in at least a partial circular array around the circumference of said second cylinder;
said exhaust ports being positioned so as to be open whenever said second inlet ports are open;
the relative port areas of said exhaust ports, said first inlet ports, and said second inlet ports being such that the total inlet port area exceeds the total exhaust port area during at least a portion of the cycle of said pistons.

3,970,058

REVOLUTION CONTROL CIRCUIT FOR INTERNAL COMBUSTION ENGINE

Hidaka Tsukasaki, and Tetsuya Inoue, both of Kariya, Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Oct. 25, 1973, Ser. No. 409,458
Claims priority, application Japan, May 11, 1973, 48-52736
Int. Cl.² F02M *39/00*
U.S. Cl. 123—102 **2 Claims**



1. A revolution control circuit for an internal combustion engine comprising:
a speed voltage generator for generating a speed voltage corresponding to the number of revolutions of said engine,
an oscillator circuit adapted to start oscillating when said speed voltage generated by said speed voltage generator becomes higher than a predetermined value and having an on-off ratio varying in accordance with said speed voltage,

a transistor circuit adapted to be turned on and off intermittently in accordance with said on-off ratio upon initiation of the oscillations of said oscillator circuit, and

a control element for increasing and decreasing the quantity of fuel delivered in synchronism with the on-off operations of said transistor circuit to decrease on an average the fuel injection quantity in accordance with the degree of deviation of said speed voltage from said predetermined value,

said control element including a servomotor operable in synchronism with the on-off operation of said transistor circuit and a control rack driven by the servomotor and said oscillator circuit including voltage detecting means having Zener diode for providing a signal when said speed voltage generator becomes higher than a predetermined value, a first transistor having a base circuit connected to said voltage detecting means being conductive when said voltage detecting means provides said signal, a capacitor connected to said first transistor, a second transistor having a base circuit connected across said emitter-collector circuit of said first transistor vai said capacitor, and a feedback circuit having another capacitor connected between the output of said second transistor and the input of said Zener diode.

3,970,059

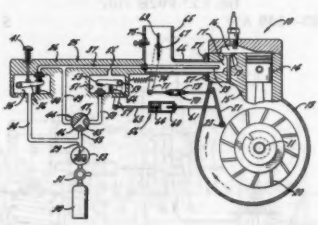
ENGINE SPEED CONTROL FOR AN INTERNAL COMBUSTION ENGINE ADAPTED FOR OPERATION WITH L.P. GAS

Robert J. Pisar, 2807 Spring Creek Road, Rockford, Ill. 61107

Filed Apr. 30, 1975, Ser. No. 573,128

Int. Cl.² F02D *11/08;* **F02M** *21/00*

U.S. Cl. 123—103 B **9 Claims**



1. An internal combustion engine having a combustion chamber, a shaft adapted to be rotated as an incident to combustion of a fuel-air mixture in said chamber, and a fan connected to said shaft and operating in accordance with the rotational speed of the shaft, said engine further including a vane mounted for pivotal movement in the path of the air circulated by said fan and adapted to swing in first and second directions as the speed of said fan respectively decreases and increases, the improvement in said engine comprising, a source of liquid petroleum gas connected to communicate with said combustion chamber, first valve means between said source and said chamber and manually adjustable to regulate the flow of gas to said chamber, second valve means between said source and said chamber and adapted, when opened, to increase the flow of gas to said chamber, an air intake communicating with said chamber, a butterfly valve mounted in said air intake for movement between open and closed positions to increase and decrease, respectively, the flow of air to said chamber, first linkage means connected between said vane and said butterfly valve for effecting movement of the latter toward said open and closed positions as said vane swings in said first and second directions, respectively, and second linkage means connected between said vane and said second valve means for effecting opening and closing of said second valve means as said vane respectively swings in said first and second directions.

3,970,060

FUEL CONTROL APPARATUS

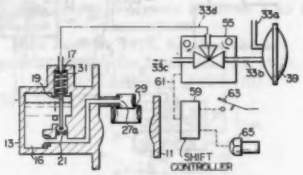
Mitunori Sasano, Toyota, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan

Filed Nov. 19, 1974, Ser. No. 525,188

Claims priority, application Japan, Apr. 10, 1974, 49-40477

Int. Cl.² F02M *7/00*

U.S. Cl. 123—119 R **4 Claims**



1. Apparatus for controlling the flow of fuel to an internal combustion engine having an intake manifold for delivering a mixture of fuel and air to a combustion space of the engine; a carburetor mounted on the intake manifold, the carburetor having a float chamber, fuel nozzles, a passageway connecting the float chamber to the fuel nozzles, valve means in the passageway for controlling the flow of fuel from the float chamber to the fuel nozzles, a vacuum chamber, and means for varying the opening of the valve means as a direct function of the absolute pressure in the vacuum chamber; and an accelerator pedal for controlling the flow of fuel and air mixture to the engine; the apparatus being of the type that includes a vacuum reservation tank, a first vacuum line for connecting the vacuum reservation tank to an intake manifold of an engine, a second vacuum line for connecting the vacuum reservation tank to a vacuum chamber of a carburetor, valve means for interrupting the connection through the first vacuum line when the absolute pressure in the intake manifold of the engine is higher than the absolute pressure in the vacuum reservation tank, and means for reducing the vacuum in the vacuum chamber of the carburetor at an adjusted slow rate when the engine is accelerating, wherein the improvement comprises:

a three-way valve disposed in the second vacuum line between the vacuum reservation tank and the vacuum chamber of the carburetor;

a third vacuum line connecting the three-way valve to the intake manifold of the engine; and

means for shifting the three-way valve between a first vacuum circuit that connects the vacuum reservation tank to the vacuum chamber of the carburetor to a second vacuum circuit that connects the intake manifold of the engine to the vacuum chamber of the carburetor.

3,970,061

CONTROL SYSTEM FOR EXHAUST GAS RECIRCULATING VALVE

Roland B. Caldwell, Worthington, Ohio, assignor to Ranco Incorporated, Columbus, Ohio

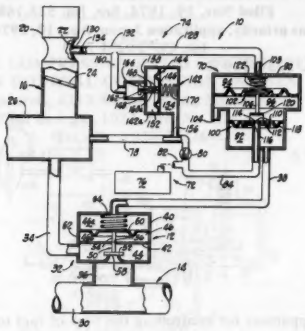
Continuation of Ser. No. 447,767, March 4, 1974, abandoned, which is a continuation-in-part of Ser. No. 320,126, Jan. 2, 1973, abandoned. This application Mar. 7, 1975, Ser. No. 556,558

Int. Cl.² F02M *25/06*

U.S. Cl. 123—119 A **11 Claims**

1. In a system for controlling the flow of exhaust gases from the exhaust system into the intake gas induction system of an internal combustion engine including a fuid operated valve to control said recirculating exhaust gas flow, fluid pressure source means providing a source of valve operating pressure, a fluid pressure regulator for controlling operating fluid pressure applied to said valve from said fluid pressure source to thereby control operation of said valve, fluid signal source

means for providing an input fluid signal to said regulator, said signal source means comprising structure for producing a fluid signal which varies as a function of the flow rate of gas through



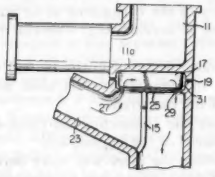
the engine and control means responsive to pressure in the intake manifold of the engine to modify said fluid signal to provide said input fluid signal to which said regulator responds.

3,970,062

ARRANGEMENT FOR HEATING THE SUCTION GASES OF AN INTERNAL COMBUSTION ENGINE

Masahiko Nakada, and Takehiko Maekawa, both of Toyota, Japan, assignors to Toyota, Japan

Continuation of Ser. No. 419,237, Nov. 27, 1973, abandoned. This application Sept. 11, 1975, Ser. No. 612,519
Claims priority, application Japan, July 31, 1973, 48-85464
Int. Cl.² F02M *31/00*
U.S. Cl. 123—122 AC **2 Claims**



1. A heater for incoming fuel-air mixture to an internal combustion engine of the type that includes an intake manifold for said mixture having a bottom floor area; a plurality of heat conducting fins extending downward from the exterior wall of the intake manifold in the bottom floor area; an exhaust manifold disposed underneath the intake manifold adjacent to the finned area for conveying hot combustion products from the engine; a circumscribing wall surrounding the finned area and having a flanged lower face for mating engagement with a flanged opening through the wall of the exhaust manifold underneath the finned area; a partition clamped between the flanged faces of the circumscribing wall and the opening in the wall of the exhaust manifold for enclosing the fins in a chamber defined by the partition, the circumscribing wall, and the exterior wall of the intake manifold, the partition having an inlet port adjacent to one side of the circumscribing wall for introducing the combustion products into the chamber and an outlet port spaced from the inlet port adjacent to the opposite side of the circumscribing wall for exhausting the combustion products from the chamber; and a butterfly type control valve mounted in the exhaust manifold in the way of the opening for rotation about a horizontal axis parallel to the wall between a first position and a second position, the valve when in the first position deflecting the flow of hot combustion gases through the inlet port to contact the fins for heating the intake gases and for returning the combustion products to the exhaust manifold through the outlet port, the valve when in the second position substantially blocking the opening through the wall of the exhaust manifold to prevent the combustion gases from contacting the fins, wherein the improvement comprises:

said partition being a thin plate having a flat unobstructed undersurface,

said opening in the wall of the exhaust manifold being obstructed only by said partition, and

the upper edge of said butterfly type control valve being positioned contiguous to the flat undersurface of the partition plate between the inlet port and the outlet port when the valve is in the first position

a first circumscribing sealing gasket secured to an entire marginal portion of one side of said flat plate and

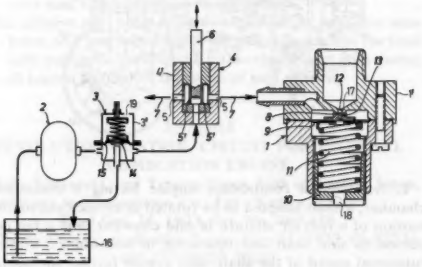
a second circumscribing sealing gasket secured to an entire marginal portion of the other side of said thin plate, said first and second sealing gaskets having openings corresponding to said flanged openings and providing hermetic seals between the one side of the partition and the flanged lower face of the circumscribing wall and the other side of the partition and the flanged opening through the wall of the exhaust manifold, respectively, when the partition is clamped between said flanged faces.

3,970,063

FUEL INJECTION SYSTEM

Theodor Mayr; Siegfried Buchta; Rudolf Kleeberger, and Otto Bauer, all of Munich, Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Oct. 24, 1974, Ser. No. 517,640
Int. Cl.² F02B *3/02*
U.S. Cl. 123—139 AW **5 Claims**



1. A fuel injection system for continuous fuel injection into the induction tube of a mixture compressing, internal combustion engine, comprising:

a. a fuel source;

b. a fuel pump connected to the fuel source;

c. a constant pressure regulator, said regulator being connected to said fuel pump and receiving therefrom a supply of fuel;

d. a fuel metering and distribution valve assembly, including:

i. a housing, provided with a bore and plurality of fuel channels; and

ii. a control slide, said control slide being mounted for displacement within said bore and extending through said housing for externally actuated displacement for the purpose of controlling the effective apertures of said plurality of fuel channels, the assembly being connected to said regulator and receiving therefrom a supply of fuel; and

e. a plurality of fuel injection valves, each being connected to a respective one of said plurality of fuel channels and each being supplied with fuel by said fuel metering and distribution valve assembly through its respective fuel channel, each of said valves including:

i. a housing;

ii. a valve seat located within said housing;

iii. a valve closing member cooperating with said valve seat;

iv. a diaphragm, fastened within said housing so that a portion thereof is movable in said housing, with said portion being attached to said valve closing member; and

v. a spring, located within said housing, whereby said spring exerts its force against said diaphragm in a direction such that said valve closing member tends to obturate said valve seat, whereby the fuel is admitted to the side of said diaphragm facing said valve seat and exerts a pressure which tends to open said valve seat, and the rigidity of said spring is such that the effect of said spring on the pressure drop across the respective fuel channel aperture is negligible.

3,970,064

RPM REGULATOR FOR FUEL INJECTION PUMPS

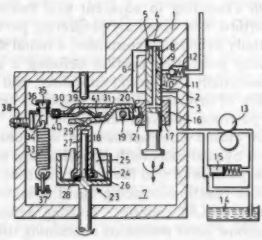
Franz Eheim, Stuttgart; Gerald Höfer, Weissach-Flacht; Karl Konrath, Ludwigsburg, and Helmut Laufer, Stuttgart, all of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Jan. 3, 1975, Ser. No. 538,374

Claims priority, application Germany, Jan. 23, 1974, 2403082; Oct. 19, 1974, 2449859

Int. Cl.² F02M *39/00*; F02D *1/04*

U.S. Cl. 123—139 ST **12 Claims**



1. In an rpm regulator for use with a fuel injection pump associated with an internal combustion engine, said regulator including a housing, an intermediate lever, a pivot shaft which pivotably mounts the intermediate lever to the housing, a stop mounted to the housing, a main control spring, means mounting one end of the main control spring to the housing, said mounting means including means for arbitrarily changing the force exerted by the main control spring, a further spring mounted in series with the main control spring and being deformable up to the stop, and an rpm governor mounted to the housing which engages the intermediate lever and exerts an rpm dependent force in opposition to the forces of the main control spring and the further spring, the improvement comprising:

a. a single-arm drag lever mounted at one end for pivotal movement to the pivot shaft of the intermediate lever and in engagement at its other end with the main control spring, the further spring and the stop, said drag lever cooperating in its movement with the intermediate lever; and

b. a compression spring mounted between the intermediate lever and said drag lever, the stroke of said compression spring being limited in both directions of force application by stops defined by the intermediate lever and said drag lever, respectively, said compression spring being embodied as a temperature dependent leaf spring having a pre-load which is greater in cold conditions and an opening formed in its middle region which produces a reduced cross section in this region.

3,970,065

FUEL INJECTION PUMP CONTROL SYSTEM

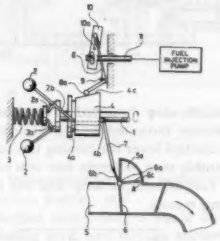
Nobuhiro Kaibara, and Kazuro Nishizawa, both of Higashimatsuyama, Japan, assignors to Diesel Kiki Co., Ltd., Tokyo, Japan

Filed June 28, 1974, Ser. No. 484,151

Claims priority, application Japan, June 29, 1973, 48-72772

Int. Cl.² F02D *1/04*; F02X *1/06*

U.S. Cl. 123—140 CC **3 Claims**



1. In a fuel injection pump assembly, especially one for use in spark-plug ignited internal combustion engines, including

a control rod, for regulating the amount of fuel metered out to the engine;

a centrifugal force governor whose rotational speed depends on the r.p.m. of the engine; and

a cam element, wherein the centrifugal force governor influences the orientation of the cam element and wherein the orientation of the cam element is transmitted mechanically to said control rod to influence the position thereof, the improvement comprising:

a. an air measuring member located within the induction tube of the engine;

b. first mechanical linkage means connecting said air measuring member to said cam element; and

c. second mechanical linkage means connecting said cam element to said centrifugal force governor, wherein said cam element is embodied as a three-dimensional cam capable of motion in at least two degrees of freedom, whereby said three-dimensional cam is displaced in one direction, preferably the axial direction, by said centrifugal force governor via said first mechanical linkage means and is displaced in another direction, preferably in rotation about its own axis, by said air measuring member acting via said second mechanical linkage means to said three-dimensional cam.

3,970,066

RPM REGULATOR FOR FUEL INJECTION PUMPS

Edgar Schmitt, Moglingen, and Karl Konrath, Ludwigsburg, both of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Sept. 24, 1974, Ser. No. 508,891

Claims priority, application Germany, Oct. 3, 1973, 2349655

Int. Cl.² F02D *1/04*

U.S. Cl. 123—140 A **5 Claims**

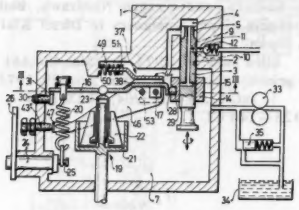
1. In an rpm regulator for use with a fuel injection pump associated with an internal combustion engine, said regulator having a housing, an intermediate lever, a regulating spring connected to the intermediate lever, and a device for generating an rpm signal and applying a corresponding force to the

intermediate lever in opposition to a force exerted by the regulating spring, the improvement comprising:

a. a two-armed control lever;

b. a shaft pivotably mounting the intermediate lever to the control lever;

c. a further shaft pivotably mounting the control lever to the housing;



d. an adjustable stop mounted to the housing; and

e. spring means mounted to the housing and engageable with the control lever for biasing the control lever against the adjustable stop, wherein one arm of said control lever engages said adjustable stop and the other arm engages said spring means.

3,970,067

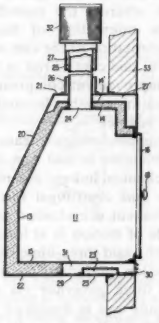
FIREPLACE ASSEMBLY FOR MOBILE HOMES

Charles O. Vaughn, P.O. Box 2, Dayton, Tenn. 37321

Filed Jan. 31, 1975, Ser. No. 545,980

Int. Cl.² F24B *1/18*

U.S. Cl. 126—120 **7 Claims**



1. A fireplace assembly particularly suited for use with a mobile home or the like, which fireplace assembly comprises in combination:

A. a firebox housing secured to an exterior wall and communicating with the interior of the mobile home;

B. a chimney communicating with the interior of the firebox housing for conducting away the products of combustion formed therein to the exterior of the mobile home;

C. a continuous annular spacing formed in the walls of said firebox housing and said chimney;

D. a combustion air intake means connected to said firebox housing for conducting exterior air directly into the interior of a mobile home said combustion air intake means including a first conduit formed within the lower portion of the firebox housing;

E. a cooling air intake means connected to said firebox housing for conducting exterior air into said annular spacing for cooling the firebox housing and chimney said cooling air intake means including a second conduit formed within said first conduit, and thereby inhibiting thermosyphonic aspiration;

F. a closure means for controlling the passage of combustion air from the interior of the mobile home to the interior of the firebox housing.

3,970,068

HEAT EXCHANGE PACKAGE FOR FOOD

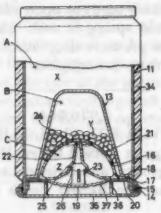
Shotaro Sato, No. 3, 1-chome, Nakatsu-Hamadori, Oyodo, Osaka, Osaka, Japan

Continuation of Ser. No. 453,897, March 22, 1974, abandoned. This application May 15, 1975, Ser. No. 577,580

Claims priority, application Japan, May 29, 1973, 48-60499

Int. Cl.² F24J *1/00*; B65B *25/22*

U.S. Cl. 126—263 **2 Claims**



1. A foodstuff container comprising, in combination:

a. an enclosed container housing having a bottom, a removable top, a first inner partition of one-piece construction comprising an essentially spherical top portion and a bottom portion provided with an upwardly projecting portion extending to adjacent said essentially spherical top portion, said upwardly projecting portion defining an essentially cylindrical container, a radial shoulder on said upwardly projecting portion defining a radial recess in said essentially cylindrical container, and a second inner partition of inverted U-shape disposed between said first inner partition and said removable top;

b. a first closed compartment in said container housing defined by said essentially spherical top portion and said bottom portion of said first inner partition and containing therein a reaction-inducing agent, a second closed compartment in said container housing defined by said first and second inner partitions containing therein a reaction agent;

c. a third closed compartment in said container housing defined by said removable top and said second inner partition for containing therein food or beverages, the mixing of said reaction-inducing agent and said reaction agent producing a thermal heating reaction; and

d. manually operable piercing means comprising an elongated needle-member comprising an upper needle, a base portion having two arc-shaped saws projecting laterally outward on opposite sides therefrom and an oval projection portion connecting said upper needle to said base portion with said saws joining said oval projection portion at right angles to the axis of the elongated needle-member, said oval projection portion being positioned within said radial recess in said cylindrical container for firmly holding said needle-member in said cylindrical container and outside said first compartment, said elongated needle-member extending upwardly from said base portion adjacent said housing bottom to said upper needle within said cylindrical container thereby coupling said needle-member to said cylindrical container, said housing bottom being provided with pleats for imparting elasticity to said housing bottom and said first inner partition being easily breakable by said needle-member, said housing bottom being manually movable upwardly together with said needle-member to permit said upper needle to pierce

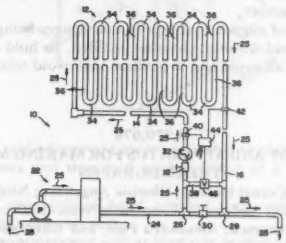
said upwardly projecting portion and said spherical top portion of said first inner partition thereby producing a mixing of the two agents in said first and second compartments for producing a desired thermal reaction so as to heat the food or beverages in said third compartment.

3,970,069

SOLAR HEATER/COOLER ASSEMBLY

John Pickett, 1232 Zacchini Ave., Sarasota, Fla. 33577

Filed Feb. 24, 1975, Ser. No. 552,286
Int. Cl.[2] F24J *3/02*
U.S. Cl. 126—271 **4 Claims**



1. A swimming pool solar heater/cooler primarily designed for use with a swimming pool pump/filter system comprising heat exchanger means, inlet conduit means in fluid transmitting communication with said heat exchanger means, outlet conduit means in fluid transmitting communication with said heat exchanger means, first valve means in flow termination contact with said inlet conduit means, check valve means in said inlet conduit means, first T-connector means in fluid driving communication with the flow line of the pool pump/filter system and said inlet conduit means, second T-connector means in fluid dividing communication with the flow line of the pool pump/filter system and said outlet conduit means and located downstream from said first T-connector means, second valve means in flow terminating relation with the flow line from the pool pump/filter system and located substantially between said first T-connector and said second T-connector, said heat exchanger means further comprising substantially hollow linear tube means, substantially hollow, generally U-shaped tube means fluidly connecting said linear tube means to form coils of said heat exchanger means, said heat exchanger means further comprises substantially solar radiation resistant heat absorbing plastic tube means, temperature difference sensing means located in temperature sensing communication with said inlet and outlet conduit means, cross connect conduit means substantially in fluid communication between said inlet and outlet conduit means, automatic valve means located substantially in said cross connect conduit means and in responsive communication with said temperature difference sensing means.

3,970,070

SOLAR HEATING SYSTEM

Stanley A. Meyer, 2931 Bryden Road, and Stephen R. Gray, 2772 Allegheny Ave., both of Columbus, Ohio 43209

Filed Sept. 3, 1975, Ser. No. 610,051
Int. Cl.[2] F24J *3/02*
U.S. Cl. 126—271 **10 Claims**

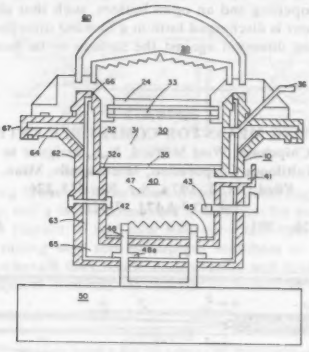
1. A solar heater comprising in combination:

an enclosure,

a collector lens positioned in the uppermost region of said enclosure, said collector lens comprising an array of light guide lenses of alternate high refractive material and low refractive material and a focusing lens;

a storage section positioned in the lowermost region of said enclosure comprised of material having a high rate of absorption to solar radiant energy to thereby convert said solar radiant energy to thermal radiant energy;

an insulating area positioned within said enclosure intermediate of said lens and said storage area, said insulating area further comprising a container with a liquid solution



therein that is transparent to solar radiation and an isothermal convection barrier; and

said enclosure further comprising a liquid and air seal to said lens, insulating area, and storage section; and

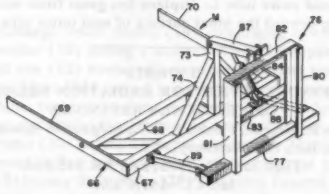
utilization means for utilizing said thermal energy in said storage section.

3,970,071

SURFACE HEATER AND DRYER

Russell A. Miller, 1412 W. Woodside Drive, Dunlap, Ill. 61525, and Earl R. Schmidgall, 702 N. Cherry Lane, Peoria, Ill. 61604

Filed Nov. 14, 1974, Ser. No. 523,830
Int. Cl.[2] E01C *11/24;* **E01H** *5/10*
U.S. Cl. 126—271.1 **30 Claims**



30. A surface heater and dryer, comprising: a housing having an upper, air intake portion; an air heating portion connected to the air intake portion to receive air therefrom; and a lower, air discharge shroud portion, blower means mounted in the air intake portion for drawing atmospheric air into the housing and discharging it into the air heating portion; burner means mounted in the air heating portion for heating the air forced therethrough; air bypass vane means in the housing adjacent the burner and located to be in operative relationship relative to that burner, such that when the vane means is closed, the air from the blower is forced through the burner, and when the vane means is open, a portion of the air is caused to flow in bypassing relationship to the burner; fuel vaporizer tubes connected to and between a source of liquid fuel and the burner and disposed between the burner and air discharge shroud portion, such that liquid fuel flowing through the vaporizer tubes is vaporized by the heat from the burner prior to the fuel being fed to the burner to thus increase the temperature output of the burner; movable vapor control means operatively associated with the vaporizer tubes and having a plural-

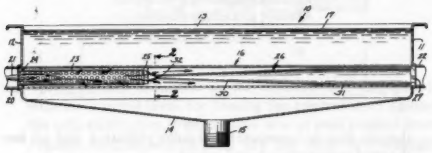
ity of positions to control the passage of heated air over the tubes, whereby in one position thereof the amount of fuel vaporized is reduced, and in another position thereof the amount of vaporization of the fuel is increased; and said shroud portion including a forwardly extending portion beneath the air intake portion and having a forwardly facing air discharge opening and an open bottom, such that air heated by the burner is discharged both in a forward direction and in a downward direction against the surface to be heated and dried.

3,970,072

HEATING MEANS FOR COMESTIBLE KETTLE

Frank D. Chipchase, West Milford, N.J., assignor to International Multifoods Corporation, Minneapolis, Minn.

Filed Oct. 2, 1974, Ser. No. 511,226
Int. Cl.² A47J *27/026*
U.S. Cl. 126—391 **9 Claims**



1. In a fire-tube type of heater, for a comestible kettle, comprising an outer tube in heat exchange relation with cooking fluid to be heated, a flue connection to said outward tube thereof, and burner means directing a flame into said outer tube at the other end thereof, the improvement which comprises:

an inner shroud tube of perforated metal mounted within and spaced from said outer tube at the burner end thereof so that said flame is directed into said shroud tube, whereby some flame passes outward through the perforations to heat said outer tube directly, and some flame remains within said shroud tube to heat said shroud tube until it acts as a radiant heat source within said outer tube;

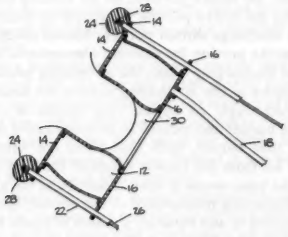
and an inner baffle tube mounted coaxially at the flue end of said outer tube to displace hot gases from said shroud tube toward the inner surface of said outer tube.

3,970,073

POSITIONING DEVICE FOR RADIATION TREATMENT OF CERVICAL CARCINOMA

Franklin R. Greene, Flushing, N.Y., assignor to Howlin Enterprises, Inc., Old Westbury, N.Y.

Filed Jan. 30, 1975, Ser. No. 545,694
Int. Cl.² A61N *5/00*
U.S. Cl. 128—1.2 **4 Claims**



1. Apparatus for radio-active treatment of cervical tumors comprising:

a flexible, collapsible, cylindrical toroidal chamber having an aperture therethrough adapted to be positioned around the cervix, said toroidal chamber having top and bottom surfaces,

top and bottom flanges extending radially outward respectively, from said top and bottom surfaces of said chamber,

each of said flanges having a plurality of openings, each opening in said top flange being aligned with a corresponding opening in said bottom flange,

an inlet tube in communication with the interior of said toroidal chamber and adapted to extend to the outside of the body and to permit flow of radio-opaque fluid into and out of said toroidal chamber, flow of fluid into said chamber when said chamber is collapsed causing said chamber to expand and flow of fluid out of said chamber when said chamber is expanded permitting collapse of said chamber,

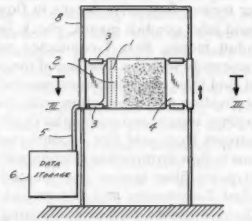
each pair of aligned openings of said flanges being adapted, when said toroidal chamber is filled, to hold a support stem of an ovoid and to position said ovoid relative to the cervix.

3,970,074

METHOD OF AND APPARATUS FOR MAKING MEDICAL THERMOGRAPHS

Ion Mogos; Cornel Ionescu; Dionisie Angelescu; Nicolae Dumitrescu; Millo Andreescu; Constantin Neascu; Mircea Brozici; Mihai Birzanescu; Alexandru Puie, and Gheorghe Vasilica, all of Bucharest, Romania, assignors to Spitalul Clinic Filantropia Bucuresti, Bucharest, Romania

Filed Aug. 22, 1974, Ser. No. 499,408
Int. Cl.² A61B *5/00*; G01K *7/24*
U.S. Cl. 128—2 H **6 Claims**



1. A method of thermographically monitoring the body of a human subject comprising the steps of displacing over the skin of the subject an array of thermistors and generating outputs representing the temperature at the body sites adjacent said thermistors; measuring said outputs with a digital voltmeter; numerically recording the temperatures as determined by said digital voltmeter as a function of the position of the respective thermistor on the subject upon a common sheet; and connecting equal temperature recordals on said sheet to form isotherms mapping the monitored portion of the body of the subject.

3,970,075

SURGICAL RETRACTOR ANCHOR APPARATUS

Frank J. Sindelar, 8 Kimball Road, and Howard J. Greenfield, 32 Yates Blvd., both of Poughkeepsie, N.Y. 12601

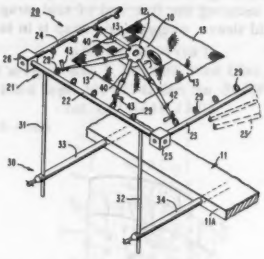
Filed Sept. 30, 1974, Ser. No. 510,218
Int. Cl.² A61B *17/02*
U.S. Cl. 128—20 **10 Claims**

1. Apparatus for fixing retractors in an adjustably predetermined position relative to an operating table, said apparatus comprising:

an anchor frame including a base member having at least one extension member projecting substantially perpendicular to said base member, a plurality of spaced apart, inwardly projecting anchor rings serially arranged along said anchor frame;

a support frame comprising upstanding post members connected to and supporting said base member of said anchor frame;

leg means, an adjustment means for adjustably connecting said leg means to said post members, and means for adjustably connecting said leg means to an operating



table; said adjustment means operable to clamp said post members and thus said anchor frame at a preselected height;

at least one resilient band adapted for connection of a retractor thereto; and,

means for connecting said at least one resilient band to one of said anchor rings.

3,970,076

APPARATUS FOR HEART STIMULATION

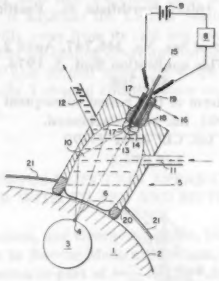
Wolfgang Hepp, Immenstaad, and Alexander Wirtzfeld, Thanning, both of Germany, assignors to Dornier System GmbH, Germany

Filed Feb. 4, 1975, Ser. No. 546,907

Claims priority, application Germany, Apr. 18, 1974, 2418631

Int. Cl.² A61H *29/00*

U.S. Cl. 128—24.5 **12 Claims**



1. A heart stimulator adapted to be used outside the body comprising pressure wave generating means and coupling means adapted to be placed on the surface of the body in the area of the heart without an air gap.

3,970,077

SUPPORT FOR PATIENTS IN BEDS OR CHAIRS

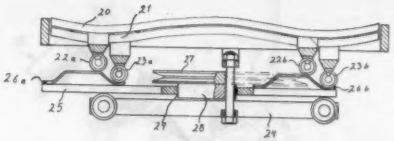
Flemming Dahl, 70 Borgervaenget, 2100 Copenhagen, Denmark

Filed Mar. 6, 1975, Ser. No. 555,730

Int. Cl.² A61H *1/00*

U.S. Cl. 128—33 **9 Claims**

1. A mechanical support for a bed or chair for eliminating bed sores, comprising at least two sets of vertically displaceable support members having rigid upper surfaces defining a contour of a human body, a separate cam follower attached to each set of support members for simultaneously vertically displacing all the support members of the set of support members attached thereto, a cam contacting each cam follower and movable with respect to each cam follower, said cam having raised surfaces concurrently contacting said cam followers attached to at least two of said sets of support members



and having lower surfaces non-currently contacting said cam followers, and a motor connected to said cam for moving said cam with respect to said cam followers, said cam followers thereby raising said sets of support members to an upper position wherein they reside concurrently and lowering said sets of support members separately.

3,970,078

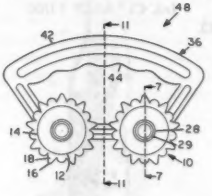
HAND ROLLER MASSAGE DEVICE

Charles G. Rogers, Jr., 5201 Roosevelt St., Hollywood, Fla. 33021

Filed Mar. 10, 1975, Ser. No. 556,725

Int. Cl.² A61H *15/00*

U.S. Cl. 128—57 **11 Claims**



1. A massage roller means **(10)** comprising a wheel-like roller member **(10)** having a somewhat broad peripheral rim **(12)**, said rim **(12)** having alternate spaced-apart transverse projecting ridges **(16)** curved in peripheral cross-section, and intermediate rectangular base pyramid shaped ridges **(18)** extending outwardly therebetween, in combination with a handle frame **(36)** having a journal means **(30, 32)** on which said massage roller means **(10)** is journaled, said pyramid ridges **(18)** having their peaks **(20)** extending beyond a plane tangent to the two adjacent curved ridges **(16)**.

3,970,079

BODY SUPPORT BINDER AND METHOD OF FABRICATING SAME

John F. Gaylord, Jr., Matthews, N.C., assignor to Medical Specialties, Inc., Charlotte, N.C.

Filed Mar. 21, 1975, Ser. No. 560,641

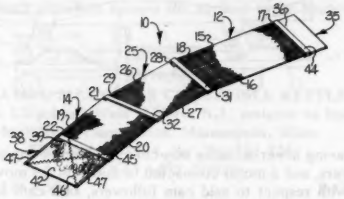
Int. Cl.² A61F *5/02*

U.S. Cl. 128—78 **16 Claims**

1. An elongate body support binder adapted to encircle and reinforce a portion of the body of a wearer and characterized by the ability to resist rolling of the longitudinal side edges when in use without employing separate stiffeners or the like, said binder comprising

a plurality of fabric panels arranged serially in adjacent end to end relationship and with the adjacent ends of the adjacent panels in substantially abutting, non-overlapping relationship to define an elongate binder having sufficient length to encircle a body member of a wearer,

means joining the adjacent ends of the adjacent panels and comprising a strip of plastic material extending along the length of the adjacent ends, said strip having an H-shaped cross-sectional configuration to define oppositely facing channels and with said adjacent ends being received within said channels, said strip further having sufficient



resistance to lateral bending to effectively prevent rolling of the longitudinal side edges of the panels when the binder is positioned about the body member of a wearer, and

fastening means carried by the panels for releasably interconnecting the distal ends of the binder.

3,970,080

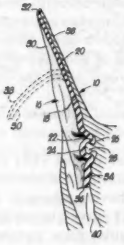
ANIMAL EAR SUPPORT DEVICE

Billy H. White, 2220 Garden St., Titusville, Fla. 32780

Filed Mar. 17, 1975, Ser. No. 559,033

Int. Cl.[2] A61F *13/00*

U.S. Cl. 128—82 **8 Claims**



1. An animal ear support comprising a pliable, self-supporting, generally concavo-convex body conforming substantially to the interior surface of the animal ear with which the support is to be used, and means for removably attaching said body to the ear against said interior surface, said body including an outer flap portion adapted to bend with the ear and an inner stem portion of increased rigor relative to the flap portion adapted to fit at least partially into the ear canal to promote retention of the ear and flap portion in an erect condition.

3,970,081

TENNIS ELBOW BRACE

Leslie T. Applegate, Jr., Cincinnati, Ohio, assignor to Surgical Appliance Industries, Inc., Cincinnati, Ohio

Filed Jan. 28, 1974, Ser. No. 437,207

Int. Cl.[2] A61F *5/24*

U.S. Cl. 128—95 **8 Claims**

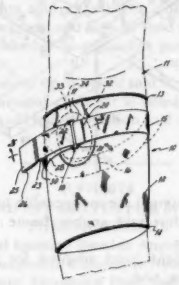
1. Elbow brace means for alleviating the discomfort of tennis elbow comprising:

a flexible elastic tubular sleeve for encircling the wearer's arm near the elbow, said tubular sleeve being of a size to be circumferentially stretched when disposed over the wearer's arm and having two edges;

a resilient pad of geometric configuration mounted upon said sleeve, the maximum transverse dimension of said pad being substantially less than the circumference of and the length of said sleeve;

a strap secured to the outside surface of said sleeve, said strap completely encircling said sleeve adjacent to, but spaced inwardly from, one of said edges;

means for securing the free end of said strap in position about said sleeve, whereby said strap is in tension;



said strap overlying said pad and being centered relative thereto, said strap being effective to exert an inwardly directed pressure upon said pad;

said pad being effective to exert a concentrated pressure upon the wearer's arm extending over an area not greater than the maximum transverse dimension of said pad, and being effective, when worn below the wearer's elbow, to change the direction of pull on the common extensor or common flexor origins.

3,970,082

HARD HAT EAR PROTECTOR

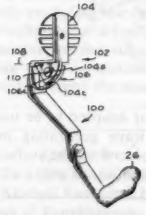
Howard S. Leight, 16027 Northfield St., Pacific Palisades, Calif. 90272

Continuation-in-part of Ser. No. 346,747, April 2, 1973, Pat. No. 3,841,326. This application Sept. 3, 1974, Ser. No. 502,308

The portion of the term of this patent subsequent to Oct. 15, 1991, has been disclaimed.

Int. Cl.[2] A61F *11/00*

U.S. Cl. 128—152 **2 Claims**



1. Protective apparatus for mounting on a protective helmet that has a rim comprising:

a mount which is mountable on a protective helmet;

link means having a first end pivotally connected to the mount and a second end;

an earplug; and

means for mounting said earplug on said second end of said link means;

said mount including a first member having means for fixing it to a helmet and a second member which is pivotally

connected to said link means, said first and second members being pivotally joined to permit pivoting about a predetermined axis, and said first and second members having teeth spaced about said axis with at least one tooth on each member engaged with a tooth on another member, to maintain said members at any one of a plurality of relative angular orientations.

3,970,083

ANKLE SUPPORT

Gordon R. Carrigan, Rte. 1, Box 608, West Linn, Oreg. 97068

Filed Sept. 11, 1974, Ser. No. 504,899
Int. Cl.² A61F *13/06*
U.S. Cl. 128—166 **8 Claims**

1. An ankle support in operative condition comprising

a pliable jacket removably fitted about a person's foot and ankle, including a pair of side expanses which extend over opposite sides of the ankle,

a first elongated stiffening strip joined to the outside of and stiffening one elongated region in that expanse which extends over the lateral side of the ankle, said first stiffening strip extending over the Lateral Malleolus in the ankle, along a course substantially paralleling natural ligaments in the ankle, and

a second elongated stiffening strip joined to the outside of and stiffening another elongated region of the same expanse, said second stiffening strip having one end overlapping said first stiffening strip at a point therealong which is adjacent the Lateral Malleolus, and extending upwardly away from its said one end along a course substantially paralleling other natural ligaments in the ankle,

said first and second stiffening strips being arranged in a generally T-shaped configuration on said expanse of said jacket.

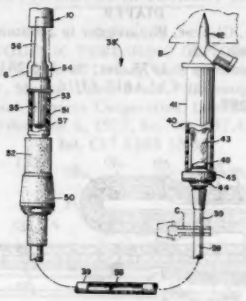
3,970,084

INTRAVENOUS INJECTION APPARATUS AND NEEDLE ADAPTER WITH FILTER AND METHOD OF MAKING SAME

Kenneth Raines, and George K. Burke, both of Bethlehem, Pa., assignors to Burron Medical Products, Inc., Bethlehem, Pa.

Continuation-in-part of Ser. No. 299,268, Oct. 20, 1972, abandoned. This application Dec. 11, 1973, Ser. No. 423,682
Int. Cl.² A61M *5/16*
U.S. Cl. 128—214 C **8 Claims**

1. An intravenous injection assembly, comprising: a length of IV tubing having source attachment means at one end thereof for attachment to a source of liquid; said source attachment means including a drip chamber; a first filter in the assembly for filtering contaminants from the liquid flowing from a source of liquid; a needle attachment means at the other end of said IV tubing including a needle adapter and filter assembly having a tubing connector connected to said IV tubing other end, a hollow filter tube connected to said tubing connector, and a needle adapter having a second filter secured thereto and removably connected to said filter tube so that said second filter is received within the hollow filter tube to be positioned between said IV tubing and a needle attached to the assembly by said needle adapter so that liquid flowing from said IV tubing into said needle flows through said second filter thereby, said first filter being located upstream of said second filter and cooperating therewith to maintain flow



through the assembly substantially at a predetermined constant flow rate therethrough and into said needle.

3,970,085

OSTOMY APPLIANCES AND SEALING ELEMENTS

Elayne R. Mersan, Minocqua, Wis., assignor to Marsan Manufacturing Company, Inc., Wausau, Wis.

Filed Nov. 29, 1974, Ser. No. 528,348
Int. Cl.² A61F *5/44*
U.S. Cl. 128—283 **10 Claims**

1. In appliances for post-surgical collection of discharges from the stoma of a patient, an improvement is a combination of sealing elements, said improvement comprising:

a base gasket element having an operative front surface and a flat back surface and including,

a centrally disposed aperture,

a tubular flange annularly disposed about said aperture and extending outwardly substantially normally from said gasket front surface, said tubular flange having a radially outwardly extending front wall,

at least one depression in said tubular flange front wall; and

a pliable washer element, said washer element including,

a radially outwardly-extending annular ring element, and,

a centrally-disposed stoma-accommodating tubular flange extending outwardly substantially normally from said ring element and having a substantially flat face adapted to contact with and seal against the skin of a patient around the stoma,

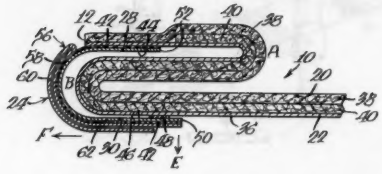
said washer element ring and flange being so dimensioned that said washer flange is registerable within said gasket flange and at least a portion of said washer ring is pliably engageable within said annular depression of said gasket tubular flange front wall when said washer flange is registered within said gasket tubular flange.

3,970,086

DISPOSABLE DIAPER HAVING TAB FASTENING MEANS WITH ONE END THEREOF RELEASABLY ADHERED TO DIAPER

Ernest Cheslow, Glencoe, Ill., assignor to Johnson & Johnson, New Brunswick, N.J.

Filed May 7, 1975, Ser. No. 575,281
Int. Cl.[2] A61F 13/16
U.S. Cl. 128—287 8 Claims



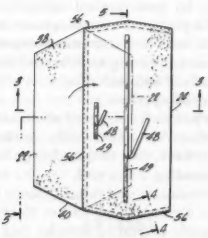
1. A disposable diaper which comprises a moisture-impermeable backing sheet forming a diaper outside surface for direction away from an infant when the diaper is worn by that infant, a moisture-retaining layer adhered to the backing sheet and having a facing which forms a diaper inside surface for direction toward the infant, tab fastener means having a fixed end permanently secured to said diaper backing sheet and a working end folded back against said diaper backing sheet and provided with a pressure-sensitive adhesive presenting a tacky surface facing in the same direction as the diaper inside surface, a cover strip means releasably adhered to said tacky surface, and an adhesive spot between the diaper backing sheet and the face of the working end opposite said tacky surface which adhesive spot abuts said diaper outside surface, whereby said working end of said tab fastener means is releasably adhered to said diaper backing sheet on the diaper outside surface.

3,970,087

HYGIENIC NAPKIN

Rosa Maria Castaneda, Jardin Balbuena, Mexico, assignor to Colgate-Palmolive Company, New York, N.Y.

Filed Dec. 30, 1974, Ser. No. 537,158
Int. Cl.[2] A61F 13/16
U.S. Cl. 128—290 H 5 Claims



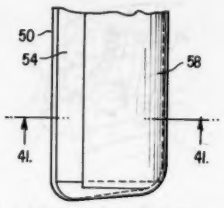
1. An hygienic napkin comprising an envelope of liquid penetrable non-woven, hydrophobic material or woven fabric, said envelope having opposed longitudinal and lateral edges and including a front portion, a back portion and a flap portion integral with the front portion and foldable to overlie said back portion, a sheet of liquid impervious waterproof material between said front and back portions, means securing said back portion to said front portion along a first opposed lateral edge portion, and wherein said front and back portions are bent inwardly along a second opposed lateral edge portion to form abutting hem portions and means securing said hem portions together.

3,970,088

ELECTROSURGICAL DEVICES HAVING SESQUIPOLAR ELECTRODE STRUCTURES INCORPORATED THEREIN

Charles F. Morrison, Boulder, Colo., assignor to Valleylab, Inc., Boulder, Colo.

Division of Ser. No. 501,224, Aug. 28, 1974. This application Apr. 24, 1975, Ser. No. 571,110
Int. Cl.[2] A61B 17/36; A61N 3/06
U.S. Cl. 128—303.14 9 Claims



1. An electrosurgical device adapted to be connected to an electrical generator having active and return output terminals, said device being used to cut, coagulate or otherwise treat human tissue or the like, said device comprising:

an insulative electrode support means;

a first electrode adapted for connection to said active output terminal;

a second electrode adapted for connection to said return output terminal, said first and second electrodes being rigidly supported a fixed distance apart by said electrode support means, both said first and second electrodes being adapted for electrical connection to said tissue;

means for respectively connecting said first and second electrodes to said active and return output terminals; and

means for maintaining a separation between said first electrode and said tissue whenever said second electrode is in contact with said tissue and said first and second electrodes are connected to their respective output terminals to insure that a current arc is established between said first electrode and the tissue.

3,970,089

CARDIOVASCULAR CATHETER SEAL DEVICE

Dwayne D. Salce, 1800 Rose Glen Ave., San Pedro, Calif. 94931

Filed Aug. 5, 1974, Ser. No. 494,463
Int. Cl.[2] A61M 25/00
U.S. Cl. 128—348 9 Claims

1. A cardiovascular catheter seal device comprising:

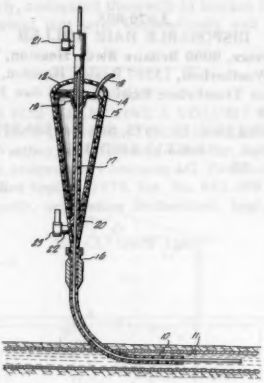
A hollow rigid body whose interior walls define a chamber open at its proximal and distal ends for the passage of a catheter therethrough;

within said chamber, a thin-walled elastomeric member whose innermost surface defines a lumen in communication with said openings so as to receive and pass said catheter, said member being secured within said body so as to prevent passage of blood through the chamber exteriorly of said lumen during catheterization;

means to adjustably distend the innermost surface of said member radially inwardly to constrict said lumen, sealing the interface between said surface and a catheter received in the lumen against the passage of blood there-

along; and

catheter sheath attachment means adjacent the proximal end of said device said attachment means being a luer fitting.



3,970,090

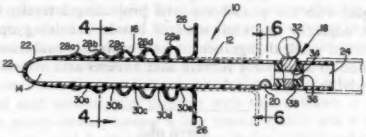
CATHETER

Vincent R. Loiacono, New London, Conn., assignor to Physio Medics, Inc., New London, Conn.

Filed Feb. 3, 1975, Ser. No. 546,393

Int. Cl.² A61M *25/00*

U.S. Cl. 128—349 R **10 Claims**



1. A catheter comprising an axially elongated tubular inner part defining a single fluid drainage passageway having a fluid inlet opening at one end and a fluid outlet opening at the other end thereof, an axially elongated elastomeric outer tubular retention sleeve integrally connected to said tubular inner part at only said one end and extending in the direction of said other end in concentric surrounding relation to said tubular inner part, said retention sleeve having a normal retention configuration characterized by an undulated outer peripheral surface defined by an axial series of annular portions including alternately arranged radially enlarged annular portions and radially reduced annular portions for engaging the peripheral wall of an associated body passageway to releasably retain said catheter in preselected position within the body passageway, said radially reduced portions of said retention sleeve being in general annular engagement with the peripheral surface of said tubular inner part when said sleeve is in its retention configuration, said retention sleeve being stretchable in the direction of said other end to an insertion configuration to permit said catheter to be freely inserted into the body passageway and removed therefrom, said retention means having gripping means at its free end providing surfaces for manual gripping to stretch the retention sleeve axially of said inner tubular part and to its insertion configuration, valve means for closing the outlet end of said passageway to prevent passage of fluid therethrough, and fluid pressure relief means associated with said tubular inner part and disposed between said inlet end and said valve means for venting fluid from said fluid drainage passageway in response to a predetermined fluid pressure condition therein.

3,970,091

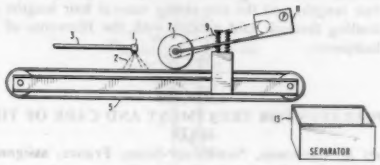
CRYOGENIC THRESHING OF TOBACCO

Jon F. Banks; Eugene F. Livesay, both of Louisville, Ky., and Reynold W. Martin, Union Beach, N.J., assignors to Brown & Williamson Tobacco Corporation, Louisville, Ky.

Filed Feb. 6, 1975, Ser. No. 547,458

Int. Cl.² A24B *5/06*

U.S. Cl. 131—122 **14 Claims**



1. A process of removing tobacco stem and vein structures from tobacco leaves comprising:

a. cooling said leaves to a temperature of between 0°C and about −210°C whereby said tobacco leaves are frozen;

b. flexing said frozen leaves whereby tobacco lamina is broken free from said stem and vein structures; and

c. separating said stem and vein structures from said lamina.

3,970,092

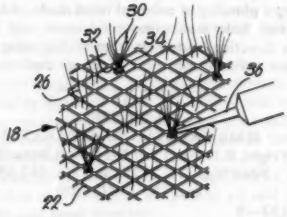
METHOD OF ATTACHING A HAIRPIECE

Charles W. Nelson, 3534 Main St., Kansas City, Mo. 64111

Continuation of Ser. No. 401,995, Oct. 1, 1973, abandoned. This application Jan. 14, 1975, Ser. No. 540,792

Int. Cl.² A41G *3/00*

U.S. Cl. 132—5 **1 Claim**



1. A method of attaching a hairpiece to the head of a recipient having at least some natural hair, said method comprising the steps of:

providing a hairpiece having a base element in the form of an open hole netting to which strands of filaments or the like have been attached to present said hairpiece;

positioning said hairpiece on the head of a recipient such that at least a portion of the recipient's natural hair underlies said base element when the hairpiece is in position;

pulling the natural hair underlying said netting through the same for protrusion therethrough to extend above said element;

selectively forming in a random pattern throughout the area of said element a series of groups of natural hair lengths comprised of a plurality of adjacent lengths thereof protruding through said netting;

dividing each group of hair lengths into two distinct groups disposed on opposite sides of an adjacent stretch of said netting;

joining together each pair of groups at a point above their respective adjacent stretch of netting;

pulling and twisting together each pair of groups such that they are in direct engagement with the proximal netting stretch to snugly dispose the same against the recipient's head beneath the point at which the pair of groups are cojoined;

locating and tying a knot in each cojoined pair of groups of hair lengths adjacent the proximal netting stretch, after the latter have been pulled and twisted together, such that the portions of hair lengths extending above each knot present free lengths and said hairpiece is firmly secured to the head of said recipient;

applying a flowable adhesive substance to each knot; and

blending the free lengths of said cojoined groups of natural hair lengths and the remaining natural hair lengths protruding through said netting with the filaments of said hairpiece.

3,970,093

APPARATUS FOR TREATMENT AND CARE OF THE HAIR

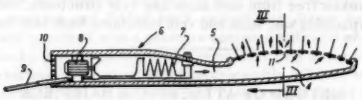
Robert A. Lardenois, Neuilly-sur-Seine, France, assignor to Etablissements Lardenois, Hermes, France

Filed Feb. 5, 1975, Ser. No. 547,211

Claims priority, application France, Feb. 25, 1974, 74.06273

Int. Cl.² A45D *20/00*

U.S. Cl. 132—9 **3 Claims**



1. A hair treating device comprising a housing, heating means disposed within said housing, an air-cushion type brush mounted upon said housing, said air-cushion type brush having a convex piece made of an elastically deformable material supporting a plurality of external teeth made of heat-conducting material, hole means mounted upon said housing and means for directing heated air from said housing through said hole means towards said teeth of the air cushion type brush.

3,970,094

HAIR TREATMENT APPARATUS

John P. Wright, R.D. No. 1 Lot D-16, Port Deposit, Md. 21904

Filed Mar. 27, 1975, Ser. No. 562,654

Int. Cl.² A45D *1/00*

U.S. Cl. 132—9 **8 Claims**

1. An apparatus for use in the treatment of hair comprising a retaining arcuate element spanning at least a portion of the human head and having slidably mounted thereon a device for treating said hair; positioned at one end of said arcuate element a positioning bracket adapted to rest on the top of an ear to align said hair-treating device in a desired position; and slidably positioned on said arcuate element a means for holding in a fixed position said hair-treating device.

3,970,095

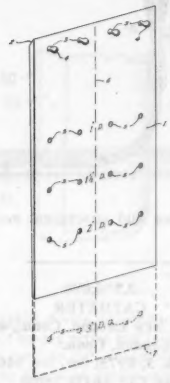
DISPOSABLE HAIR ROLLER

Zodell W. Prince, 8000 Bellaire Blvd., Houston, Tex. 77036; Dallas D. Weatherholt, 13207 Buxley, Houston, Tex. 77045, and Adelene Trombatore Reistino, 1002 San Jose, Hearne, Tex. 77859

Filed Mar. 10, 1975, Ser. No. 556,957

Int. Cl.² A45D *2/02*

U.S. Cl. 132—39 **3 Claims**



1. In a hair roller, a sheet of pliable material, the thickness of said sheet being gradually reduced longitudinally, buttons integral with the pliable material projecting laterally from a point adjacent one end, rows of button receiving openings spaced in vertical alignment in said material, each row being adapted to selectively receive said buttons and maintain said material in a cylindrical shape.

3,970,096

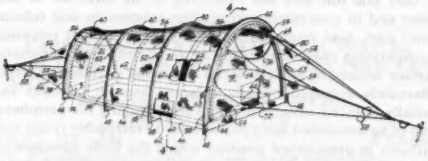
TENT

William S. Nicolai, 3314 Wallingford Ave. N., Seattle, Wash. 98103

Filed Mar. 10, 1975, Ser. No. 556,776

Int. Cl.² A45F *1/10, 1/12, 1/16*

U.S. Cl. 135—14 V **11 Claims**



1. A tent comprising a plurality of spaced, arched rafters disposed in substantially, parallel, spaced relation to each other and symmetrically disposed about a common longitudinal axis; an outer, nonporous tent layer supported by said rafters and forming a substantially semicylindrical outer tent layer; a porous inner tent layer; means suspendedly supporting said inner tent layer, connected to said outer tent layer, supporting said inner layer relatively close to and in spaced relation to said outer tent layer, and providing an air passage between said tent layers; nonporous, substantially semiannular shaped, end members, extending radially and angularly between the outer and inner tent layers; means holding the lower end portions of said end members downwardly and spacing

the inner tent layer from the outer tent layer; and tensioning means connected to the opposite end portions of said outer tent layer permitting forces directed in opposite directions to be, respectively, connected therewith to tension the end portions of the outer tent layer longitudinally and in opposite directions.

3,970,097

APPARATUS FOR MEASURING A VOLUME OF LIQUID AND METHOD OF OPERATING SAID APPARATUS

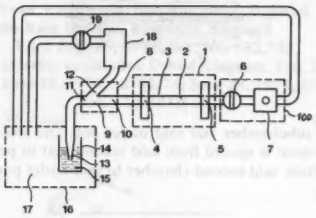
Hans Rudolf Voellmy, and Hermann Gähwiler, both of Zurich, Switzerland, assignors to Contraves AG, Zurich, Switzerland

Filed Sept. 8, 1975, Ser. No. 611,499

Claims priority, application Switzerland, Sept. 23, 1974, 12846/74

Int. Cl.² G01F 1/00

U.S. Cl. 137—1 13 Claims



1. An apparatus for measuring a predetermined volume of a liquid, comprising conduit means through which the liquid flows, said conduit means having a first conduit section containing a measurement path, a connection element having an outlet conduit means, said first conduit section having opposed ends, one end of said first conduit section being in flow communication with the outlet conduit means of said connection element, a first inlet conduit and a second inlet conduit, said connection element interconnecting said first inlet conduit and said second inlet conduit with one another, a first valve, a pump device having a low pressure side and a high pressure side, said first conduit section being connected at its other end by means of said first valve with the low pressure side of said pump device, a liquid container for the liquid flowing through the conduit means, a second conduit section including means providing a dynamic pressure drop at the flowing liquid, said first inlet conduit being continuously connected with said liquid container via said second conduit section, a fluid container, said second inlet conduit being continuously in flow communication with said fluid container, a second valve for flow communicating said fluid container with a space, said liquid container being continuously in flow communication with said space, the high pressure side of said pump device opening into said space.

13. A method of measuring a predetermined volume of a flowing liquid, comprising the steps of:

a. providing a conduit through which flows the liquid whose volume is to be determined;
b. at least partially filling the conduit with such liquid;
c. applying a negative pressure to the conduit in order to convey the liquid contained therein through the conduit;
d. introducing a fluid slug from a fluid supply into the liquid in the conduit;
e. detecting the passage of the fluid slug along a predetermined path of travel through the conduit in order to thereby measure a predetermined volume of the flowing liquid; and
f. substantially equalizing the pressure between the fluid supply and a space with which communicates the liquid in order to re-establish a starting condition of the apparatus.

3,970,098

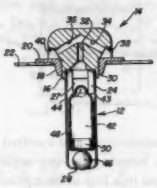
TANK VENT

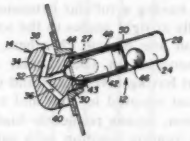
Stuart E. Boswank, Garland; Robert H. Jones, Euless, and Newton P. Whaley, Carrollton, all of Tex., assignors to Southwest Wheel and Manufacturing Company, Dallas, Tex.

Filed Nov. 1, 1974, Ser. No. 520,059

Int. Cl.² F16K 17/36

U.S. Cl. 137—39 6 Claims





4. A wall mounted tank vent for selectively venting the differential in gas pressure between the interior and exterior of a tank containing a liquid comprising:

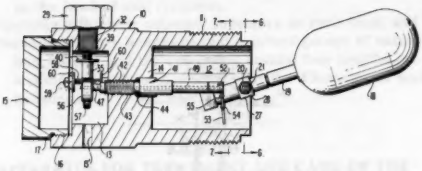
a. a flanged head member formed of a thermosensitive material and containing a set of exterior threads adapted to be sealably disposed within the wall of said tank;
b. a housing connected at one end to said head and forming a chamber therein which communicates with the interior and exterior of said tank;
c. a fixed annular frustro-conically shaped valve seat disposed within said chamber at the end of said chamber proximate said head member;
d. a free sliding, elongated, cylindrical buoyant member adjacent said valve seat;
e. a protruding cylindrical valve surface, disposed on the end of said free sliding buoyant member adjacent said fixed annular seat having a surface area substantially less than the surface area of said end;
f. a free moving weighted member, disposed within said chamber adjacent the end of said buoyant member opposite said valve surface capable of direct contact with said buoyant member and having a weight at least slightly greater than the combined buoyant force of said buoyant member and said weighted member;
g. a vertical passageway disposed within said head having one end communicating with said chamber through said annular valve seat;
h. a pair of radial apertures contained in said head, sloped toward said tank, and communicating with said vertical passageway; and
i. a pair of recesses, disposed within said head and having an inside diameter substantially larger than that of said radial aperture, each one communicating between one of said apertures and the exterior of said tank.

3,970,099

LIQUID LEVEL RESPONSIVE VENT VALVE

Frank W. Murphy, Jr.; J. David Nunneley, both of Tulsa, and Teddy Howard Cruse, Broken Arrow, all of Okla., assignors to Frank W. Murphy Manufacturer, Inc., Tulsa, Okla.

Continuation-in-part of Ser. No. 608,279, Aug. 27, 1975, abandoned. This application Jan. 6, 1976, Ser. No. 646,936
Int. Cl.² F16K *31/18*, *33/00*; G05D *9/00*
U.S. Cl. 137—101.25 11 Claims



1. A liquid level monitoring and control fluid system venting device comprising a housing having separated chambers and adapted to be coupled in a liquid receptacle with one chamber in communication therewith, a pivoted float on said housing near said one end including a float arm extending into said one chamber, a vent valve for said control fluid system on the housing near the other end thereof and adjacent the other chamber of the housing and adapted for coupling in said control fluid system to be vented, said vent valve including a control fluid fitting having a tubular extension in said other chamber substantially at right angles to the axis of said housing and the common axis of said chambers, a sleeve valve element slidably mounted on said tubular extension, said sleeve valve element having a vent port and carrying a compressible seal element adapted to abut and close the end of said tubular extension, means resiliently biasing said sleeve valve element to a venting position with said seal element spaced from the end of the tubular extension, said housing having an interface wall separating said chambers, a rotary shaft means extending axially of the housing on said interface wall and operatively coupled with said float arm and said sleeve valve element whereby pivoting of the float arm will shift said sleeve valve element in concert with said biasing means between control fluid venting and non-venting positions.

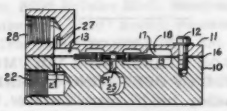
3,970,100

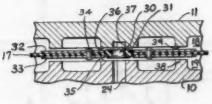
PRIORITY VALVE

Robert L. Jones, Irvine, Calif., assignor to Parker-Hannifin Corporation, Cleveland, Ohio

Filed May 7, 1975, Ser. No. 576,149
Int. Cl.² G05D *16/06*; F15C *3/04*
U.S. Cl. 137—112 6 Claims

1. A priority valve comprising a housing having a valve chamber, first and second valve seats respectively on first and second opposite and parallel walls of said chamber, a flexible diaphragm of elastomeric material extending between said opposite walls and dividing the chamber into first and second subchambers, said diaphragm having an annular central portion of enlarged thickness with seating portions on opposite ends thereof so as to constitute a valve element, said valve element having an opening therethrough immediately adjacent said seating portions that serves as a passage for fluid, a first inlet port for fluid connected to said first subchamber, a second inlet port for fluid connected to second subchamber, an outlet port connected to said first subchamber centrally of one of said valve seats and registering with said opening, said diaphragm being movable by pressure of fluid in said first chamber when said latter pressure is greater than pressure of fluid in the second chamber whereby said valve element engages the second valve seat to seal said opening from said second chamber and is spaced from said first seat to permit flow of fluid from said first subchamber to said outlet port, and said diaphragm being movable by pressure of fluid in said second chamber when the latter pressure is greater than the pressure of fluid in the first chamber whereby said valve element engages said first seat to close communication between





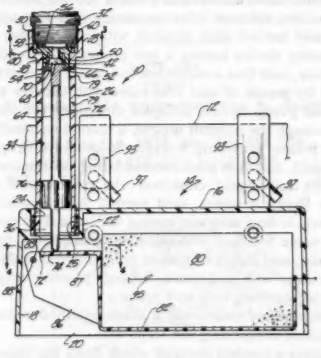
the first subchamber and said outlet port and whereby said valve element is spaced from said second seat to permit flow of fluid from said second chamber to said outlet port via said opening.

3,970,101

FLOAT CONTROLLED VALVE ASSEMBLY

Robert M. Wilson, Battle Creek, Mich., assignor to Dare Products, Incorporated, Battle Creek, Mich.

Filed Mar. 17, 1975, Ser. No. 559,218
Int. Cl.² F16K *24/02*
U.S. Cl. 137—216 5 Claims



1. A float valve assembly for a liquid storage tank comprising; a housing, bracket means connected to said housing and adapted to support said housing in said tank below an upper edge of the latter, float means supported by said housing for movement relative thereto in response to changes in liquid level in said tank, an elongated conduit member extending vertically relative to said mounting means and projecting above said bracket means, said conduit member forming a liquid inlet above said bracket means and a liquid outlet in said housing, valve means disposed in said conduit between said inlet and outlet and being movable between open and closed positions, an elongated actuating member axially movable in said conduit for moving said valve means between said positions, said actuating member being disposed above and

having a portion resting in abutting engagement on said float means for movement upwardly to close said valve means in response to upward movement of said float means and being movable downwardly in abutting engagement with said float means upon downward movement of the latter, said actuating member being free to rotate generally about the axis of said conduit during upward and downward movement of said float means, guide means formed at spaced points axially of said actuating member and acting between said conduit and said actuating member for maintaining the latter in axial alignment in said conduit member during axial and rotational movement of said actuating member, said guide means including a plurality of annularly spaced guide elements disposed adjacent said inlet and being operable to guide said valve means into said closed position, and vent means communicating the interior of said conduit with the exterior of the latter and being disposed intermediate said valve means and said outlet.

3,970,102

PIPE-FOLLOWING IRRIGATION MACHINE

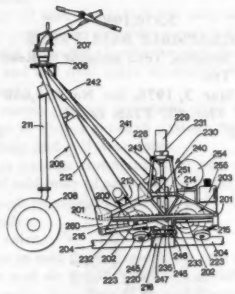
Vernon Bryan William Harvey, Ringwood, England, assignor to Wright Rain Limited, Ringwood, England

Filed Feb. 25, 1975, Ser. No. 552,743

Claims priority, application United Kingdom, Feb. 28, 1974, 9049/74; June 28, 1974, 28702/74; June 28, 1974, 28703/74

Int. Cl.[2] E01H *3/02*

U.S. Cl. 137—344 **8 Claims**



1. Irrigation apparatus comprising a water supply pipe extending over ground to be irrigated; a plurality of upwardly-facing hydrants spaced apart in the length of the pipe; a self-closing valve in each hydrant and an irrigation machine arranged to follow the pipe and to be coupled to the hydrants in succession, the machine comprising a vehicle; at least one traction wheel supporting said vehicle and running on an upwardly-facing surface of the pipe; a pair of side guidance devices carried by said vehicle and engaging opposed side surfaces of said pipe to maintain said traction wheel substantially centrally aligned on said upwardly-facing surface of said pipe; a vertically-movable riser pipe carried by said vehicle; a driving motor connected to said vehicle to drive said traction wheel to propel said vehicle along said pipe from one hydrant to another and to stop said vehicle with said riser pipe positioned substantially vertically above a hydrant; a hoist to raise and lower said riser pipe to couple the lower end of said riser pipe with a hydrant at which said vehicle has stopped; a track on each hydrant extending in the longitudinal direction of said pipe and having end walls spaced apart by a known distance; a locating device carried on said riser pipe and engageable in said track of the hydrant at which said vehicle has stopped prior to coupling said lower end of said riser pipe with said hydrant to shift said riser pipe to bring said riser pipe into precise vertical alignment with said hydrant before coupling of said riser pipe with said hydrant is effected; a valve-opening member on said riser pipe and operable to hold open the valve in said hydrant while said riser pipe is coupled with said hydrant; and co-operable clamping faces on said vehicle and said hydrant to hold the vehicle in the position of precise vertical alignment while water is flowing from said hydrant to said riser pipe.

3,970,103

RETRACTABLE GAS LINE CONNECTING APPARATUS

Albert E. McKee, deceased, late of Chicago, Ill. (Harris Trust and Savings Bank, executor), assignor to Oxequip Health Industries Inc., Chicago, Ill.

Continuation of Ser. No. 265,050, June 21, 1972, abandoned. This application Jan. 2, 1974, Ser. No. 432,108

Int. Cl.[2] F16L *3/18*

U.S. Cl. 137—357 **16 Claims**

2. Apparatus adapted to interconnect (1) a termination gas line extending downwardly through a ceiling to (2) an item of gas utilizing equipment located on the floor beneath the ceiling, comprising in combinaton:

a. a tubular outer member having a gas inlet end and a gas outlet end;

b. a tubular piston rod of substantially the same length as said tubular outer member telescopically mounted in said tubular outer member with a first end thereof extending outwardly from said outlet end of said tubular outer member and having an internal diameter substantially smaller than the internal diameter of said tubular outer member;

c. piston means mounted on the other end of said piston rod in the annular space between said piston rod and said tubular outer member and presenting an annular piston surface to the opening of said gas inlet end of said tubular outer member;

d. spring means mounted in said annular space between said piston rod and said tubular outer member which exerts a biasing force on said piston greater than the force exerted on said piston at the gas inlet end of said tubular outer member, whereby said piston is urged toward said inlet end of said tubular outer member when the apparatus is connected to said gas line;

e. a fixed coupling means mounted in the ceiling for coupling said inlet end of said tubular outer member to a termination gas line; and

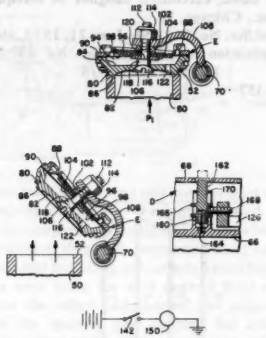
f. means for coupling said first end of said piston rod to an item of equipment located on the floor beneath said ceiling.

3,970,104

FUEL FILTER BYPASS VALVE WITH CONDITION PRELIMINARY INDICATOR AND SECONDARY INDICATOR

Maurice S. Decker, Columbus, Ohio, and George T. Downey, Corry, Pa., assignors to Midland-Ross Corporation, Cleveland, Ohio

Filed Jan. 9, 1975, Ser. No. 539,814
Int. Cl.[2] F16K 37/00
U.S. Cl. 137—494 9 Claims



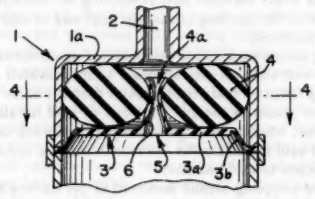
4. A valve assembly comprising; a valve body having a movable member attached thereto for limited movement away therefrom and defining a variable volume chamber with said valve body, yieldable biasing means attached to said movable member for biasing same toward said valve body and biasing said valve body against a valve seat, port means past said valve body communicating with said chamber, said movable member and valve body being proportioned for providing movement of said movable member away from said valve body against the force of said biasing means under influence of a substantially lower pressure than that required to move said valve body away from the valve seat against the force of said biasing means, a lever connected with said movable member, a rotatable shaft connected with said lever, and said biasing means being connected with said shaft for normally rotating same in a direction for applying force through said lever to move said movable member toward said valve body and said valve body toward a valve seat.

3,970,105

TOROIDAL PRESSURE REGULATOR

Peter G. Pelton, Carol Stream, and Obert M. Ostrem, Westmont, both of Ill., assignors to Continental Can Company, Inc., New York, N.Y.

Filed June 16, 1975, Ser. No. 587,484
Int. Cl.[2] F16K 31/12
U.S. Cl. 137—498 3 Claims



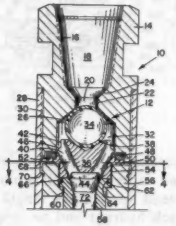
1. An improved pressure regulator comprising a double-ended hollow chamber member having outlet means at one end thereof and a pressure reactive member sealing the second end with inlet means therethrough, and inlet throttling means in said chamber member, said inlet throttling means being operable by said pressure reactive member to open and close said inlet means to maintain the pressure at a predetermined level in said chamber member, said pressure reactive member comprising a substantially flat and rigid plate element and a peripheral, extensible bellows element, said bellows element being attached to said chamber member, said inlet means comprising an opening in the center of said plate element, said throttling means comprising a body having a central passage therethrough, said body being oriented with the axis of said central passage substantially aligned with said passage in said plate element, said chamber member having a major axis and said place element of said pressure reactive member being displaceable along said major axis in response to pressure changes within said chamber member, said body being reformable consequent to axial displacement of said plate element of said pressure reactive member, the cross-sectional area of said central passage of said body being reduced consequent to compression of said body between planar elements perpendicular to said axis of said passage, said chamber member having an end panel at said first end, and said body being compressed between said plate element and said end panel consequent to axial displacement of said plate element toward said first end, said inlet means including a reformable tube member extending from said opening in said plate element through said central passage of said body, said compression of said body reducing the cross-sectional area of a portion of said tube member.

3,970,106

COLLAPSIBLE BALL VALVE

Jesse Harris, San Antonio, Tex., assignor to Reed Tool Company, Houston, Tex.

Filed Mar. 3, 1975, Ser. No. 554,640
Int. Cl.[2] F16K 15/14
U.S. Cl. 137—843 9 Claims



1. A collapsible ball check valve for use with high pressure fluid, said valve comprising:

a housing having an inlet passage therein with a space therebetween;

a hollow ball located in a fixed position in said space for sealing said inlet passage by pressing against walls forming said inlet passage as the walls connect to said space;

seat means for retaining said hollow ball in said space, flow passages extending through said seat means to said outlet passage, said seat means having a retaining surface abutting said hollow ball in said fixed position;

said hollow ball sealing said inlet passage against fluid flow by being pressed between said wall forming said inlet passage and said retaining surface of said seat means in said fixed position, said hollow ball being resilient to collapse under a given pressure in said inlet passage to allow unrestricted fluid flow through said inlet passage, flow passages and outlet passage, upon loss of said given pressure in said inlet passage said hollow ball resumes a spherical configuration to prevent reverse flow through said inlet passage, flow passages and outlet.

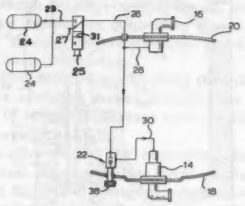
3,970,107
ROLL OVER VALVE FOR TANK TRUCK

Allen M. Bower, Painsville, Ohio, assignor to Emco Ltd., London, Canada

Continuation-in-part of Ser. No. 506,941, Sept. 18, 1974, abandoned. This application Apr. 15, 1975, Ser. No. 568,345

Int. Cl.² F16K *24/00*

U.S. Cl. 137—587 **3 Claims**



1. A gasoline or like tank truck assembly comprising a tank having a top and a bottom,

an air operable vent on said top of said tank,

an air operable emergency valve on said bottom of said tank,

a drain and roll over valve having a body on the bottom of said tank,

said body of said drain and roll over valve having an air supply passage, an air outlet passage and a drain passage,

a manually operable closure for said drain passage of said drain and roll over valve accessible from the outside of said tank,

said air supply passage communicating with said air outlet passage to form a through passage through said body of said drain and roll over valve,

said drain passage communicating with said air outlet passage of said body of said drain and roll over valve to form a through passage through said body of said drain and roll over valve,

a check valve,

a retainer in said drain passage for said check valve,

a seat in said air supply passage for said check valve, said check valve being free to move between said retainer and said seat,

said retainer being adapted to retain said check valve when air pressure is applied to said air supply passage,

said seat being adapted to seat said check valve whereby to close said air supply passage to said drain passage when said closure for said drain passage is opened and air pressure is applied to said drain passage,

an air supply valve having an outlet,

manual operating means for said air supply valve accessible from outside said tank for connecting said outlet of said air supply valve to said air operable vent and to said air supply passage of said drain and roll over valve,

said air outlet passage of said drain and roll over valve being connected to said air operable emergency valve.

3,970,108
PRIORITY HYDRAULIC CONTROL VALVE

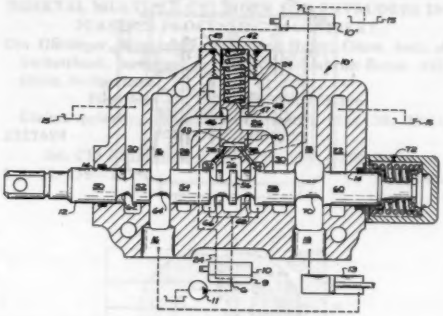
Roger Howard Ailshie, Lewis, Kans., assignor to Cross Manufacturing, Inc., Lewis, Kans.

Filed Oct. 23, 1973, Ser. No. 408,930

Int. Cl.² F17D *3/00*

U.S. Cl. 137—596.13 **3 Claims**

1. An open-center valve section which establishes priority flow in the adjacent upstream section in a series of connected open-center valves utilized in a stack, the valve section having a body provided with a bore and a valve element slidable therein defining an open-center flow passage connecting a fluid pressure source to reservoir through the other sections in the stack; a motor passage; a return passage connected to reservoir; a blind-ended power passage connecting the fluid pressure source to said bore; the valve element having a first position with flow to the motor passage blocked and the open-center passage open, allowing fluid from the pressure source to pass to reservoir and second position blocking flow in the open-center passage and allowing flow from the power passage to the motor passage, the improvement comprising:



a load check valve means positioned in the power passage normally springbiasing the power passage closed; and

servo means having a piston and connecting chamber separate from said power passage operating the load check valve responsive to pressure in the open-center passage opening the power passage only when sufficient pressure exists in the open-center passage.

3,970,109
SHUTOFF AND CONTROL SLIDE

Johannes Uerlichs, Woffelsbach; Rudolf Müller, Merzenich, and Hermann-Josef Stolberg, Birkesdorf, all of Germany, assignors to Hermann Rappold & Co. GmbH, Duren, Germany

Filed Feb. 20, 1975, Ser. No. 551,509

Claims priority, application Germany, Feb. 27, 1974, 2409444

Int. Cl.² F16K *1/44*

U.S. Cl. 137—601 **22 Claims**

1. A shutoff and control slide comprising:

an open-ended cylinder having therein at least one row of circumferentially spaced elongated openings;

an open-ended sliding sleeve mounted for axial displacement within said cylinder;

a plurality of rings sealingly positioned against the inner surface of said cylinder, one each on each axial side of said at least one row of openings in said cylinder, each of said rings having an axially facing annular abutment surface, the abutment surfaces of said rings being spaced by a predetermined axial distance;

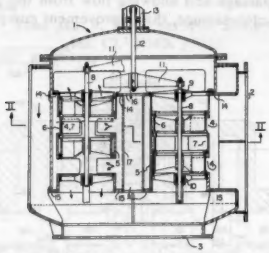
a plurality of abutment members, equal in number to said plurality of rings, extending outwardly from the outer surface of said sliding sleeve, each of said abutment members having an axially facing abutment surface, the axial spacing between adjacent of said abutment surfaces of said abutment members being equal to said predetermined axial distance;

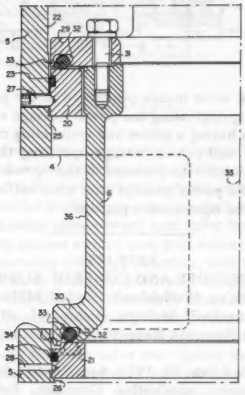
sealing members positioned on at least one of said abutment surfaces of said abutment members and said abutment surfaces of said rings; and

said sliding sleeve being axially movable from a first position wherein said abutment surfaces of said abutment members and said abutment surfaces of said rings are sealed by said sealing members and said openings in said cylinder are sealingly covered by said sliding sleeve, to a second position wherein said abutment surfaces of said abutment members and said abutment surfaces of said rings

are spaced apart and said openings in said cylinder are uncovered by said sliding sleeve.

21. A shutoff and control slide assembly comprising a housing having therein a plurality of shutoff and control slides as





claimed in claim 1, and further comprising a first housing connection in said housing jointly communicating with said openings in said cylinders, and a second housing connection in said housing jointly communicating with open ends of said sliding sleeves and said cylinders.

3,970,110

SAFETY INLET AIR VALVE CONTROL ARRANGEMENT FOR AIR POWERED HAND HELD TOOL

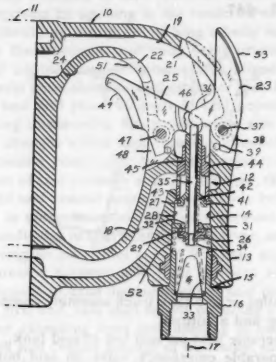
Raymond J. Schaedler, New Hartford, and Livio F. Marcantonio, Utica, both of N.Y., assignors to Chicago Pneumatic Tool Company, New York, N.Y.

Filed Feb. 6, 1975, Ser. No. 547,473

Int. Cl.² F16K 11/10

U.S. Cl. 137—613 20 Claims

17. In the handle of a pneumatically powered hand held tool, a chamber having an inlet at one end connectible to a live air source, and having an outlet at its opposite end connectible to an air motor of the tool; a first valve means controlling flow of source air through the inlet to the chamber comprising a first valve, a seat about the inlet engageable by the valve, a stem extending axially from the valve through the chamber, a spring in a passage below the seat biasing the valve closed upon the seat, and a manually depressible first lever for actuating the valve to open condition against the bias of the spring, the lever projecting externally of the handle and having an inner end abutting a rear end of the stem of the valve; and a second valve means controlling flow from the chamber through the outlet to the motor of source air admitted through the first valve means to the chamber, the second valve means comprising a second valve, a seat about the outlet engageable by the second valve, a hollow stem extending axially from the second valve in sleeved relation to the stem of the first valve, spring means in the chamber biasing the second valve closed upon its seat, and a manually depressible second lever for



actuating the second valve to open condition, the second lever projecting externally of the handle and having an inner end abutting a rear end of the hollow stem of the second valve, and each lever being manually actuable independently of the other to move its related valve to open condition without affecting the closed condition of the other valve.

3,970,111

ELECTROMAGNETIC 3-WAY VALVE ARRANGEMENT

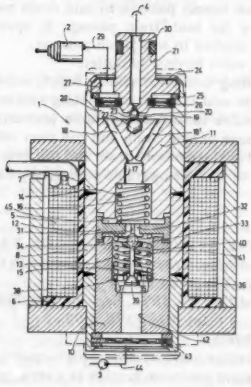
Gerhard Brüne, Bamberg-Gaustadt; Helmut Staib, Bamberg; Heinrich Kochendörfer, Rommelshausen; Waldemar Hans, Bamberg; Walter Röpstorff, Bamberg-Gaustadt; Heinz Leiber, Leimen, and Lothar Kirstein, Heidelberg, all of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Aug. 13, 1975, Ser. No. 604,500

Claims priority, application Germany, Sept. 4, 1974, 2442372

Int. Cl.² F15B 13/044, 13/043

U.S. Cl. 137—627.5 10 Claims



1. In an electromagnetic 3-way valve arrangement for controlling the flow of a pressure medium between a pressure source and a pressure receiver, and between the pressure

receiver and a pressure relief point, the arrangement comprising:

inlet conduit means for connecting the valve arrangement to the pressure source;

outlet conduit means for connecting the valve arrangement to the pressure receiver;

relief outlet conduit means for connecting the outlet conduit means to the pressure relief point;

inlet valve means for controlling flow of the pressure medium through the inlet conduit means; and

outlet valve means for controlling flow of the pressure medium through the relief outlet conduit means, the improvement comprising:

inlet armature means for controlling the inlet valve means, said inlet armature means including an inlet armature capable of limited movement between an energized and a de-energized position;

outlet armature means for controlling the outlet valve means, said outlet armature means including an outlet armature capable of limited movement between an energized and a de-energized position; and

a magnetic coil energizable in two stages, said coil causing one of said armatures to assume its energized position when the coil is energized at a first stage of excitation, and causing the other of said armatures to assume its energized position while said one of said armatures is maintained in its energized position when the coil is energized at a second stage of excitation.

3,970,112

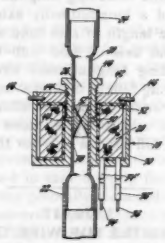
CONTROL VALVE

James A. Bernard, Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Dec. 8, 1975, Ser. No. 638,967

Int. Cl.² F16K *9/00, 31/06*

U.S. Cl. 137—807 **2 Claims**



1. A flow control valve for a fluid having a quantity of small magnetic particles mixed therewith comprising: a tubular member of non-magnetizable material defining an intermediate control passage between end portions serving as an inlet and an outlet, respectively; an electromagnetic coil assembly with a substantially annular configuration encircling the intermediate portion of the tubular member and including multiple turns of conductive wire thereabout; said coil assembly including a housing of readily magnetizable material having an inner cylindrical wall closely encircling said intermediate portion and extending partially from one end toward a second end, terminating therebetween to form an end surface; said second end of the housing having an opening therein spaced from the intermediate portion of said tubular member; a calibration member closely encircling said intermediate portion and extending through the opening in said second end; said calibration member having an end surface movable with respect to said first end surface by insertion and withdrawal through the opening in said second end of the housing; said housing and said calibration member being of readily magnetizable material, such as iron, whereby when said coil means is energized, a magnetic field is produced in said housing and calibration member extending between the spaced surfaces to create magnetic poles thereof which attract a plurality of iron particles from said refrigerant to the inner wall of said intermediate portion, thereby creating an annular accumulation of particles to decrease the flow area.

3,970,113

BIMETAL MULTIPLE CYLINDER FOR EXTRUDERS IN PLASTICS PROCESSING MACHINERY

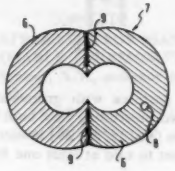
Urs Güttinger, Hagendorf, and Hans Hofer, Olten, both of Switzerland, assignors to Motorwagenfabrik Berna AG, Olten, Switzerland

Filed May 28, 1974, Ser. No. 473,896

Claims priority, application Germany, May 30, 1973, 2327684

Int. Cl.² F16L *9/00, 9/22;* **B29B** *1/04;* **B29F** *3/02*

U.S. Cl. 138—157 **18 Claims**



1. A bimetal multiple cylinder for extruders in plastics processing machinery comprising a plurality of longitudinally extending, cut-away, bimetal tubes mounted adjacent each other and with their longitudinal axes spaced from and substantially parallel to a common axis, each of said tubes being unitary and having an outer base metal supporting an inner metal lining, the outer base metal being of high strength to withstand distortion and provide strength, rigidity, and stability so that said multiple cylinder requires no external jacket in use and the inner lining being metallurgically bonded to and integral throughout with the outer metal and having greater wear resistance than said outer metal, each said tube having a longitudinally extending slot from the exterior to the interior thereof which is adjacent said common axis and having a pair of faces, one on each side of said slot, extending longitudinally and outwardly from said common axis; each said tube being mounted with one face thereof contacting a face of a next adjacent tube and with the other face thereof contacting another face of a next adjacent tube and said tubes being welded together by welds between the contacting faces formed by metal of the tubes themselves and extending both from adjacent the innermost extents of said faces outwardly of said common axis to the outermost extents of said faces and extending longitudinally along said faces.

3,970,114

HEALD FRAME WITH MOVABLE HOLDING ELEMENT FITTED ON THE FRAME STAVE

Hans Baumann, Horgen, Switzerland, assignor to Grob & Co. Aktiengesellschaft, Horgen, Switzerland

Filed Apr. 9, 1975, Ser. No. 566,475

Claims priority, application Switzerland, Apr. 18, 1974, 5396/74

Int. Cl.² D03C *9/06*

U.S. Cl. 139—91 **10 Claims**

1. In a heald frame assembly the improvements comprising:

a. at least one frame stave (1, 1') with a hollow, closed cross-section having generally parallel side walls, and two ribs (12, 13) extending along the length of the frame stave and protruding beyond an end wall of the cross-section toward the longitudinal centerline of the heald frame

assembly, said ribs being in the same planes as the side walls of the frame stave;

b. at least one holding element (5, 26) displaceably attached to said at least one frame stave, said holding element having portions with groove-shaped sections to engage said two protruding ribs, and

c. securing means (16, 21, 28, 29) to secure said at least one holding element to said at least one frame stave.

3,970,115

DEVICE FOR MONITORING THE YARN TRAVEL IN THE SHUTTLE OF A SHUTTLE LOOM

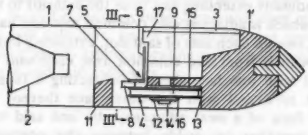
Erhard Kenk, Vaihingen, and Theo Kenk, Karlsruhe, both of Germany, assignors to Aktiengesellschaft Gebruder Loepfe, Wetzikon, Switzerland

Filed May 16, 1975, Ser. No. 578,213

Claims priority, application Germany, May 25, 1974, 2425437

Int. Cl.² D03D *51/34*

U.S. Cl. 139—371 **11 Claims**



1. A piezoelectric transducer device for monitoring yarn travel in a shuttle of a loom, wherein the shuttle has a front end provided with a threader having a thread inlet, said device comprising an integral assembly which includes an induction coil unit, a yarn feeler member mounted on one side of the induction coil unit for being vibrated by the traveling yarn, and a piezoelectric transducer element mechanically coupled with the yarn feeler member and operatively connected with the induction coil unit, wherein the improvement comprises:

the induction coil unit is shaped as a substantially flat unit having two major faces in substantially parallel relationship to one another;

the yarn feeler member is arranged as a unilaterally clamped flexural vibratory member comprising an arm disposed in substantially perpendicular relationship to said major faces of the induction coil unit and having a free end for contacting the traveling yarn; and

means for directly and rigidly connecting the yarn feeler member and piezoelectric transducer element with one another.

3,970,116

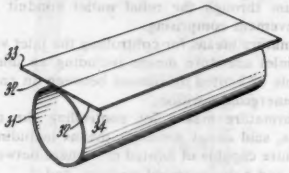
METHOD OF WEAVING A COMPOSITE TUBE AND WEB AND RESULTING ARTICLE

Takezo Takada, deceased, late of Hikone, Japan, and by Juichiro Takada, legal authorized heir, 3-12-1, Shin, Setagaya, Tokyo, Japan (154)

Continuation-in-part of Ser. No. 385,387, Aug. 3, 1973, abandoned. This application Jan. 31, 1975, Ser. No. 546,162

Int. Cl.² D03D *3/02*; D03C *13/00*

U.S. Cl. 139—387 R **5 Claims**



1. The method of producing a composite woven tube and web article in which the tube and web include longitudinally extending warps and are sustantially tangent to each other along a longitudinal axis parallel to said warps and spaced from and between the edges of the web comprising interweaving warps extending along said tube and said web with successive filling runs at least some of which are individually interwoven with warps both in the tube and web and extend along a portion of the periphery of said tube and between said longitudinal axis and an edge of said web and some of said filling runs extend for their full lengths only across the full width of said web and some of said filling runs extend for their full lengths only across the upper part of said tube.

4. A composite woven article including a longitudinally extending woven tube including longitudinal warps and peripheral fillings and a longitudinally extending woven web extending along the length of said tube and tangent thereto along a longitudinal axis of said web between the edges thereof and including longitudinally extending warps and transversely extending fillings interweaving said warps of said web, some of said web filling runs extending also along a lower adjacent portion of said tube and some of said filling runs extending for their full lengths only for the full width of said web.

3,970,117

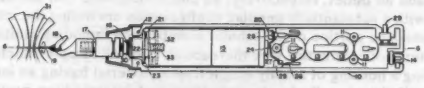
TWISTER FOR WIRE TIES

Asher Z. Zamansky, 33 Cottage St., and Hyman H. Zamansky, 114 Cottage St., both of Chelsea, Mass. 02150

Filed July 14, 1975, Ser. No. 595,520

Int. Cl.² B21F *15/04*

U.S. Cl. 140—93 A **8 Claims**



1. An electrically powered hand held wire tying assembly comprising

a handle adapted to be held by an operator,

an electric motor non-rotatably seated within said handle,

said motor having a shaft oriented with its axis extending from the rear to the front of said handle,

said handle having a forward opening providing direct access to the shaft of said motor,

a hook rotatably interconnected with said shaft of said motor through said forward opening in said handle,

a first electrical switching means contained in said handle which, when said hook is engaged and restrained from

rearward motion, is activated by the application to said handle of a rearwardly directed force,

said motor being so interconnected with said first switching means as to function only when said first switching means is activated,

said first switching means being deactivated upon cessation of the application of said rearwardly directed force.

3,970,118

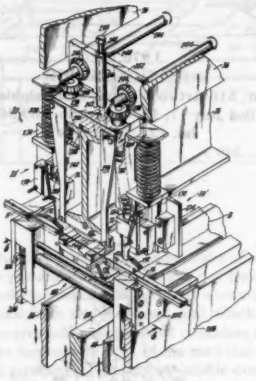
ROCK FASTENER MACHINE

Leroy M. Varga, Dover, N.J., assignor to Rockaway Corporation, Rockaway, N.J.

Filed May 29, 1975, Ser. No. 581,762

Int. Cl.² B21F 27/14

U.S. Cl. 140—93 C 50 Claims



1. A prong forming and driving mechanism for use in a loop forming and fastening machine for making wirebound container blanks, said mechanism being adapted to be mounted on a first vertically reciprocal crossbar in the loop forming machine for movement therewith and being operated by a second vertically reciprocal crossbar in the machine, said mechanism including a housing operatively connected to said first crossbar for movement in unison therewith, a wire former bar slidably mounted in said housing for vertical reciprocal movement, a loop bar pivotally mounted on said housing for movement in a transverse vertical plane with respect to said former bar and having a lower end including a hook-like projection arranged to project beneath the free end portion of a binding wire extending beyond said projection from one side of a loop formed in the binding wire, said former bar having a lower end portion including an inner face generally coplanar with the plane of movement of the adjacent inner face of the loop bar and having a vertical groove formed therein for receiving said free end portion of said binding wire; a drive bar, including a lower end, being slidably mounted in said housing adjacent said former bar for vertical reciprocal movement with respect to said former bar and housing in the vertical plane of said loop bar, with said lower end thereof being normally located above said hook-like projection and above the level of the lower end of the former bar; said driver bar being adapted to be moved vertically downwardly in said housing by spring means being operatively connected between said driver bar and said housing for normally biasing said driver bar to a first uppermost position with respect to the housing; first means operatively connecting said driver bar to said former bar for holding the former bar with the driver bar in said uppermost vertical position with the lower end of the driver bar at a level above the lower end of the former bar, while allowing downward vertical movement of said driver bar with respect to said former bar under the influence of said second crossbar; second means operatively and simultaneously engaging the lower end of said driver bar, said former bar and a portion of said housing for initially preventing relative downward movement of said driver bar with respect to the former bar under the influence of the second crossbar whereby the driver bar and former bar move downwardly together for a predetermined distance until the former bar has been moved downwardly with respect to loop bar and bent the portion of the binding wire extending beyond the loop bar downwardly around the loop to form a prong in the vertical groove and for thereafter releasing said drive bar for further downward movement with respect to the former bar and housing under the influence of said second crossbar, said driver bar including cam means cooperating with said loop bar for pivoting said loop bar outwardly from beneath said binding wire as, and after, the driver bar is released for further downward movement whereby said wire prong is driven into the face material of the container blank with the prong being supported, as it is driven, on one side by said loop bar and on its other sides by the walls of said groove in the former bar.

3,970,119

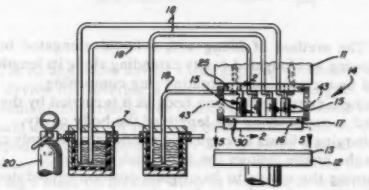
METHOD AND APPARATUS FOR MANUFACTURE OF DISPOSABLE THERMOMETERS

Frank A. Doane, Syosset, N.Y., assignor to Colorflo Leasing Inc., Villa Park, Ill.

Filed Apr. 19, 1974, Ser. No. 462,252

Int. Cl.² B65B 3/12

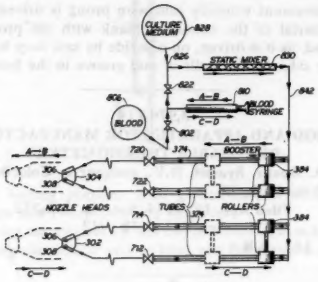
U.S. Cl. 141—1 R 9 Claims



1. Apparatus for the manufacture of disposable thermometers wherein a thermometer comprises a carrier for receiving temperature responsive liquid crystal material, said apparatus comprising a base for supporting a plurality of carriers, storage means for storing liquid crystal material, a plurality of reciprocating injector means in fluid communication with said means for storing liquid crystal material, delivery means comprising a die plate connected to each of the plurality of reciprocating injector means for receiving liquid crystal material from said plurality of injector means and for depositing said liquid crystal material on selected ones of the carriers, means associated with each selected carrier for providing a visual indication of the temperature range in which a deposit of liquid crystal material on the carrier will change state, a spacer plate disposed between said plurality of injector means and a first side of said die plate, each of said injector means including an outlet passage, said die plate including a plurality of fluid passages extending therethrough, fluid passages in said spacer plate communicating with said outlet passage of said injector means and said fluid passages, in said die plate, means for simultaneously reciprocating said plurality of injector means so that the die plate reciprocates simultaneously with said injector means, means for substantially sealing the delivery means against leakage of liquid crystal material and for maintaining the liquid crystal material out of contact with hydrocarbons which are soluble in liquid crystal material comprising a sheet of Teflon disposed between said die plate and said spacer plate, the Teflon sheet being deformable by reciprocation of the injector means to fit portions of the contour of the first side of said die plate, fluid passages formed in said Teflon sheet in substantial alignment with the fluid passages in said spacer plate, the fluid passages allowing liquid crystal material to pass from the injector means to said first

side of said die plate and the Teflon sheet sealing the junction of the first side of the die plate and the spacer plate against liquid crystal material leakage while maintaining the liquid crystal material out of contact with hydrocarbons which are soluble in liquid crystal material.

3,970,120
FILLING MACHINE
Alten E. Whitecar, Westville, N.J., assignor to SmithKline Corporation, Philadelphia, Pa.
Filed Dec. 20, 1974, Ser. No. 535,106
Int. Cl.² B65B *3/04*
U.S. Cl. 141—1 R **31 Claims**



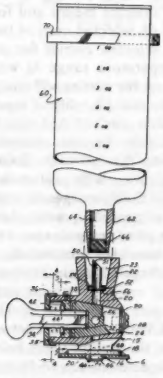
26. The method of filling with a liquid elongated bodies each having an elongated cavity extending along its length and carried by a continuously rotating ring comprising:

causing a nozzle to follow a body as it is carried by the ring and to move along the length of the body cavity,

discharging a liquid through said nozzle into the body cavity as the nozzle follows the body, and

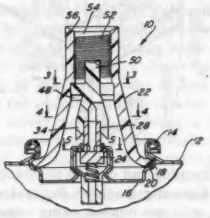
returning the nozzle to its original position preparatory to the filling of another body cavity.

3,970,121
LIQUID INJECTOR
Michael W. Brandt, P.O. Box 1092, Stillwater, Okla. 74074
Continuation-in-part of Ser. No. 462,364, April 19, 1974. This application Dec. 13, 1974, Ser. No. 532,446
Int. Cl.² B65B *3/04*
U.S. Cl. 141—2 **14 Claims**



1. A process of injecting pesticide into a pressurizable container for spraying pesticide and water comprising the steps of: depositing a measured quantity of pesticide in a hollow tubular body having an outlet passage; detachably securing the tubular body to a valve body secured to the container; forming a fluid-proof seal between the tubular body and the valve body; venting the pressurizable container such that the interior of the container is at atmospheric pressure; moving a valve element in the valve body to a position such that a passage through the valve communicates with the inside of the container; increasing pressure inside the hollow tubular body to transfer the measured quantity of pesticide from the tubular body through the valve into the container; moving the valve element in the valve body to close the passage through the valve body; disconnecting the tubular member from the valve body on the container; depositing water in the container such the water is mixed with the measured quantity of pesticide in the container; and pumping air into the container such that pressure inside the container is greater than atmospheric pressure.

3,970,122
INFLATION DEVICE
Mark E. Scott, 616 Artwood Drive, Philadelphia, Pa. 19115
Filed July 17, 1974, Ser. No. 489,301
Int. Cl.² B65B *3/04*
U.S. Cl. 141—349 **7 Claims**



1. An inflation device comprising:

a. a container having a fluid therein under pressure, said container having a discharge valve which includes a hollow discharge tube,

b. a tubular nozzle housing open at both ends, one end portion of said nozzle housing being secured to said container and circumscribing said discharge tube, the other end portion of said nozzle housing having threads on its ID, a guide bore on the ID of said nozzle housing between the location of said thread and said one end portion of said nozzle housing,

c. a discrete actuator for said discharge valve, means for reciprocally disposing said actuator in said bore, said actuator having flange means in contact with said bore, said actuator having a depending portion below said flange means, said depending portions having a passage communicating with said discharge tube, said depending portion having a surface for contact with an end face of said discharge tube, and said actuator having a projection above the flange means so that the projection is circumscribed by said threads,

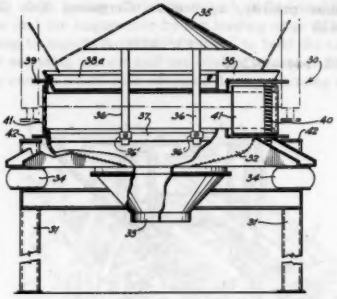
d. means defining a flow path within said nozzle housing from said passage to said other end portion of said nozzle housing, and

e. whereby external force on said projection causes said depending portions to move said discharge tube and open said discharge valve so that fluid may flow from said container through said discharge tube, passage and flow path.

3,970,123
HANDLING OF MATERIALS

Barrie Armstrong Poulton, Cheltenham, and Robert Paton Bayne, Cheadle Hulme, both of England, assignors to Simon-Barron Limited, Stockport, England

Filed May 13, 1974, Ser. No. 469,481
Int. Cl.² B65G 67/40
U.S. Cl. 141—351 21 Claims

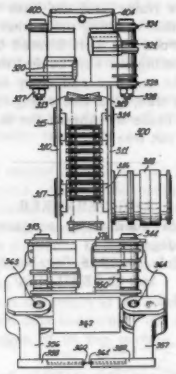


1. Apparatus comprising the combination of a transportable container for particulate materials, and equipment adapted to be permanently located at the position where the material is to be dispensed from the container, and which is adapted to removably receive said transportable container and to actuate said container to promote flow of the material from the container to said equipment, said transportable container having an opening at its lower end defined at the base of a wall portion of downwardly decreasing cross section, a valve member mounted within the container in the direct path of material in the container to normally close said opening and to be movable upwardly within the interior of the container to define an annular dispensing opening between its periphery and the internal surface of said lower wall portion of the container, and said equipment having actuating means for said valve, the arrangement being such that when said transportable container is positioned on said equipment, said valve actuating means on said equipment is operatively connected to said valve member to automatically raise the same a predetermined extent relative to the body of the container and thereby provide said dispensing opening, and means operative when said container is so combined with said equipment for effecting material flow promoting vibration of surfaces of both said container and equipment that are contacted by said material during discharge of said material into the equipment, said equipment comprising a material receiving member of generally dish-like form and having a central circular bottom opening therein, frame means for supporting said material receiving member in an elevated position with respect to the ground, resilient isolator means disposed between the receiving member and the frame means, pad means on the frame means adapted to engage with and support said transportable container in position above the equipment, upstanding means supported by the material receiving member at a central elevated position and adapted to raise said valve member by a predetermined extent when the container is positioned on the equipment, means for forming a seal between the periphery of the material receiving member and the outside wall surface of the lower portion of the container when the container is positioned on the equipment, and said vibrating means comprising means for vibrating the material receiving member and said upstanding means whereby vibrations are also transmitted to the valve member of the transportable container in the combination.

3,970,124
METHOD AND APPARATUS FOR SEVERING AND MARKING TREES

Douglas D. Hamilton, Mount Royal, Canada, assignor to Logging Development Corporation, Montreal, Canada

Filed June 27, 1975, Ser. No. 591,040
Claims priority, application Canada, July 3, 1974, 203948
Int. Cl.² A01G 23/08; B44B 5/00
U.S. Cl. 144—3 D 10 Claims

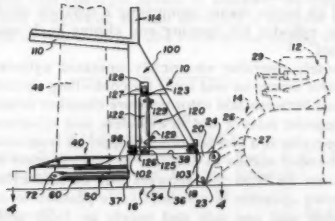


1. In an apparatus having a tree gripping device and a severing device for severing a tree into discrete lengths, the improvement comprising: tree marking means mounted movably on said apparatus for placing a mark on the trunk of the tree, grasped by the gripping device, at a position spaced from the severing device, and means actuating the marking device for placing a mark on the tree trunk in response to severing of the same by said severing device, said mark on the trunk indicating the position to subsequently sever the trunk providing a log of selected length.

3,970,125
TREE CUTTING APPARATUS

Aubrey S. Muirhead; John Martin; Patrick J. Martin, and Ross H. Rigler, all of Prince George, Canada, assignors to Muirhead Machinery Ltd., Prince George, Canada

Continuation of Ser. No. 217,471, Jan. 13, 1972, abandoned.
This application July 2, 1973, Ser. No. 375,804
Int. Cl.² A01G 23/08; B27B 5/10
U.S. Cl. 144—34 R 5 Claims



1. Tree cutting apparatus attachable to a vehicle to be operated therefrom and comprising a base frame, an anvil blade carried by the base frame and extending outwardly therefrom in a generally horizontal direction, a movable blade mounted on the base frame in opposition to and for swinging movement towards and away from the anvil blade, a cutter rotatably mounted on the movable blade and extending longitudinally opposite the anvil blade, said cutter being a substan-

tially cylindrical shaft having helical flutes and cutting edges on the outer surface thereof, drive means for rotating the cutter about its longitudinal axis, power means operable to swing the movable blade towards the anvil blade whereby the rotating cutter progressively is advanced to cut through a tree entered between the blades, a pusher frame hingedly mounted on the base frame for swinging movement about an axis extending substantially parallel to the longitudinal axis of the anvil blade, a tree-engaging arm extending outwardly from an upper end of the pusher frame, and power means interconnecting the pusher frame and the base frame, said power means being operable to swing the pusher frame whereby to tilt the tree and open the kerf formed by the cutter, said movable blade entering the kerf behind the cutter to engage the butt end of the cut tree and carry a major part of the weight of said cut tree, said tree-engaging arm cooperating with the movable blade to support the substantially upright and overbalanced cut tree.

3,970,126

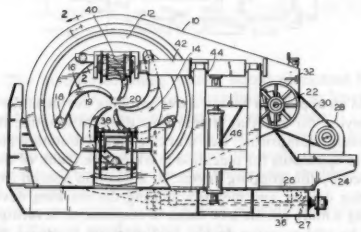
LOG DEBARKER

W. Henry Allen, Sherwood, Oreg., assignor to Kockum Industries, Inc., Talladega, Ala.

Filed July 14, 1975, Ser. No. 595,594

Int. Cl.² B27L *1/00*

U.S. Cl. 144—208 E **25 Claims**



1. In a ring-type log debarker having a housing, an annular rotor mounted for rotation on said housing, plural barking tools mounted on said rotor symmetrically about the axis of rotation thereof for movement between an open inoperative position and closed operative positions, tool-operating means including an air motor means for operating each barking tool, and an external source of air pressure to said rotor, the improvement comprising:

static air pressure chamber means within said rotor for supplying air under operating pressure to all of said air motor means,

said air motor means comprising a separate double-acting air cylinder for opening and closing each said barking tool,

remotely operable electrically operated cylinder control valve means on said rotor for controlling air communication between said rotor pressure chamber means and the opposite sides of said air cylinders, said valve means being operable in a first position to supply air from said pressure chamber means to one side of said cylinders and to exhaust air from the opposite side of said cylinders and being operable in a second valve position to exhaust air from said one side and supply air from said pressure chamber means to said opposite side of said cylinders for positive opening and closing of said barking tools,

means on said rotor normally isolating said static air pressure chamber means from said external source of air pressure and from atmosphere during rotation of said rotor for maintaining said pressure chamber means under a predetermined static pressure,

and means for adding pressurized air to said pressure chamber means from said external source during rotation of said rotor to maintain or increase static air pressure within said pressure chamber means.

3,970,127

MACHINE TOOL WORKPIECE FEED CARRIAGE

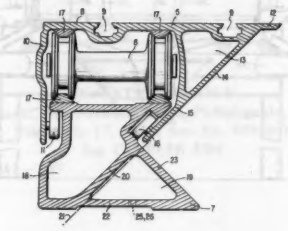
Siegfried Thiele, Minden-Haverstadt, Germany, assignor to Wilhelm Altendorf, Maschinenbau, Minden, Westphalia, Germany

Filed Feb. 26, 1975, Ser. No. 553,511

Claims priority, application Germany, Feb. 27, 1974, 2409420

Int. Cl.² B27C *1/12*

U.S. Cl. 144—242 R **6 Claims**



1. In a feed carriage for holding a workpiece, the carriage being mounted on a housng of a machine equipped with a working tool, and being located to one side of the tool, the carriage including: an upper carriage portion in the form of a light-metal profile presenting a clamping surface for the workpiece; a lower carriage portion in the form of a light-metal profile fastened to the machine housing; and a center carriage composed of guide rollers on which the upper carriage portion moves and which supports the upper carriage portion on the lower carriage portion, the upper carriage portion and the lower carriage portion extending far beyond the machine housing in the direction of the length of the carriage, the improvement wherein said upper carriage portion is provided with a free arm member which extends downwardly at an angle of approximately 45° with respect to said clamping surface and said lower carriage portion comprises two closed profile members constituting a one-piece unit and including a common partition connecting said profile members together, said partition being positioned to constitute an extension of said free arm member.

3,970,128

ORIENTATION OF CANT FOR TRANSLATORY FEED THROUGH EDGING CUTTERS

Ulrich Kohlberg, Jarfalla, Sweden, assignor to Saab-Scania Aktiebolag, Linkoping, Sweden

Filed Apr. 16, 1975, Ser. No. 568,609

Claims priority, application Sweden, Apr. 22, 1974, 7405347

Int. Cl.² B27B *1/00, 31/06*

U.S. Cl. 144—245 A **5 Claims**

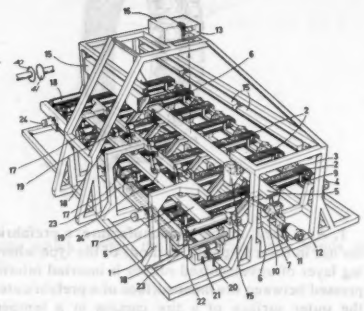
1. Apparatus by which a cant having substantially flat and parallel top and bottom surfaces and unfinished lengthwise extending wane surfaces can be oriented for substantially lengthwise translatory motion through a pair of spaced apart edging cutters by which the cant is converted into a finished piece of optimum size as determined by calculations made on the basis of data obtained with a scanning device at a scanning station, said apparatus comprising:

A. a plurality of endless conveyors having elongated upper stretches which

1. are disposed in a common horizontal plane,

2. extend across said scanning station in lengthwise parallel laterally spaced relation to one another and
3. are driven for unison lengthwise motion in a forward direction to cooperate in transporting past the scanning station a cant that extends transversely across time;

B. a pair of scanning stops which are
1. laterally adjacent to said stretches of the endless conveyors and
2. spaced apart along a datum line at said scanning station that extends transversely to said stretches, said scanning stops having abutments which define said datum line and are engageable by the leading edge of a cant being transported on said stretches to hold the cant at the scanning station and establish a reference line on the cant to which data obtained during scanning of the



cant can be related, said reference line corresponding with said datum line when the cant is so held;

C. means for effecting relative vertical motion between the scanning stops and said stretches whereby the scanning stops can be established alternatively
1. in an operative position projecting above said plane for engaging a cant on said stretches, or
2 in an inoperative position wholly below said plane to permit a cant on said stretches to be carried beyond the scanning station;

D. an orienting stop for each scanning stop,
1 located above said plane and
2 forwardly aligned with its scanning stop. to engage said points on the leading edge of a cant that is being transported forwardly away from the scanning station and stop the cant;

E. means for adjustingly moving each orienting stop to any selected one of a plurality of operative positions that are at different distances in said forward direction from the datum line, to enable the orienting stops to cooperate in establishing a cant with its said reference line in an optimum orientation according to calculations made on said data;

F. feed conveyor means arranged to carry a cant towards the edging cutters with horizontal translatory motion and in a direction transverse to said forward direction, said feed conveyor means being at a location adjacent to the orienting stops;

G. means for effecting relative vertical motion between the feed conveyor means and said stretches, to enable a cant to be transferred from said stretches to the feed conveyor means after the cant has been oriented by its engagement with the orienting stops, so that the cant can be translated towards the edging cutters by the feed conveyor means; and

H. means for moving each orienting stop to an inoperative position which is farther in said forward direction from said datum line than any of said operating positions of the orienting stop, so that the orienting stop does not disrupt the established orientation of the cant when it is moved towards the edging cutters by the feed conveyor means.

4. A method of orienting a cant having substantially flat and parallel top and bottom surfaces and untrimmed lengthwise extending wane surfaces, to so dispose the cant for substantially lengthwise translatory motion through a pair of spaced apart edging cutters that the cant is thereby converted into a finished piece of optimum size as determined by calculations made on the basis of a scanning of the top surface of the cant at a scanning station, and in which method the cant is carried to the scanning station and beyond the same to a location at which the cant is oriented as aforesaid by means of a plurality of endless conveyors having elongated, parallel and laterally spaced apart upper stretches that lie in a common horizontal plane and are driven in unison in a forward direction, said method comprising:

A. placing a cant, top surface uppermost, onto said upper stretches near the rear ends thereof, with the cant lengthwise substantially transverse to the lengths of said stretches;

B. at a scanning station located spaced from both ends of the belt conveyors, engaging the leading edge of the cant, at a pair of spaced apart points thereon, to confine the cant against forward movement with said upper stretches and establish a reference line on the cant which extends through said pair of points and to which data obtained during scanning can be related;

C. while the cant is stationary at the scanning station, scanning it to obtain data concerning the relationship of the longitudinal edges of its top surface to said reference lines;

D. on the basis of said data, adjusting a pair of orienting stops, one for each scanning stop and each aligned in said direction with its scanning stop and spaced in said direction therefrom, to bring the orienting stops to positions such that they cooperate to define a line corresponding to the optimum orientation of said reference line for translation of the cant through edging cutters in a direction transverse to said direction of motion of said stretches;

E. vertically disengaging the scanning stops from the cant and, after scanning, causing the cant to resume motion with said stretches of the belt conveyors so that it is carried by them into engagement with both orienting stops;

F. effecting relative vertical motion between said stretches of the endless conveyors and a set of conveyor means arranged to carry a cant in horizontal translatory motion in a direction transverse to said stretches of the endless conveyors, to transfer the cant from the belt conveyors to said conveyor means and cause the cant to be supported by said conveyor means, out of engagement with said stretches;

G. moving the orienting stops in the direction away from the scanning stops to disengage them from the cant; and

H. driving said conveyor means to translate the cant substantially lengthwise in said direction transverse to the lengths of said stretches and towards the edging cutters.

3,970,129

SALES SLIP WALLET

Barry Tepfer, 2 Lawrence St., New Hyde Park, N.Y. 11040

Filed Mar. 19, 1975, Ser. No. 559,698

Int. Cl.[2] A45C *11/18*

U.S. Cl. 150—39 **10 Claims**

1. A low cost, easily fabricated wallet and holder particularly for credit card receipts, small pieces of paper and the like comprising panel means, and elastic means joining said panel means and positioned proximate the periphery thereof to couple the same and allow temporary separation thereof and insertion of the papers, wherein each of said panel means are formed with aperture means and slot means communicating therewith, said elastic means including a pair of elastic bands placed substantially opposed on said panel means coupling

same by passing through a respective array of said aperture means access to which is provided by said slot means extending from the outer edge of said panel means to receive said elastic means.

3,970,130

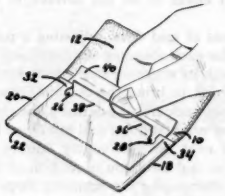
TICKET HOLDER

Everett Randolph Casey, 5845 Old Orchard Trail, Orchard Lake, Mich. 48033

Filed Sept. 15, 1975, Ser. No. 613,171

Int. Cl.² A45C *11/18*

U.S. Cl. 150—39 **6 Claims**



1. A carrying case for a ticket or the like comprising a flexible plastic sheet having a transverse fold line and foldable about said fold line to define mating front and back cover portions, a flat transparent plastic facing element having lateral, bottom and top edges and having a width between said lateral edges greater than the width of a ticket and a height between said bottom and top edges greater than the height of the ticket, means securing each of said lateral and said bottom edges to an inner portion of said foldable plastic sheet to one side of said transverse fold line to define a pocket open at said top edge to accept the ticket, said flexible facing element having first and second outboard flaps and a central flap, each of said flaps constituting a portion of said facing element adjacent to and including a portion of said top edge of said facing element, each of said outboard flaps extending from the adjacent lateral edge of said facing element to a point inboard thereof lying short of the midpoint of said top edge of said facing element, each of said outboard flaps having a side edge extending generally in the same sense as the lateral edges of said facing element, said central flap being disposed between said outboard flaps, the length of said central flap being established by a pair of spaced-apart side edges directed in a converging sense in a direction toward said bottom edge of said facing element to define a narrower portion of said flap spaced from said top edge, said central flap being bendable and bending along said narrower portion in response to a bending force applied to said central flap along the top edge portion thereof, tension forces lifting said central flap away from said plastic sheet being transmitted through portions of said facing element between said central flap and each of said outboard flaps to deflect portions of each of said outboard flaps away from said plastic sheet.

3,970,131

TREAD FOR THE RECAPPING OF TIRES AND METHOD OF MAKING THE SAME

Wilhelm Schelkmann, Witten, Germany, assignor to Vakuum Vulk Holdings Ltd., Nassau, Bahamas

Division of Ser. No. 394,721, Sept. 6, 1973. This application May 24, 1974, Ser. No. 473,305

Claims priority, application Germany, Sept. 9, 1972, 2244391

Int. Cl.² B60C *11/00*

U.S. Cl. 152—185 **17 Claims**

1. As a novel article of manufacture, a prefabricated tread for use in tire-recapping methods of the type wherein a bonding layer of unvulcanized rubber is inserted intermediate and pressed between the inner surface of a prefabricated tread and the outer surface of a tire carcass at a temperature high enough to cause the unvulcanized rubber of the bonding layer to flow into intimate contact with said surfaces and become vulcanized to effect permanent bonding of the prefabricated tread to the carcass, the novel prefabricated tread being a molded one-piece structure having a profiled external road-engaging surface and having an internal surface substantially completely covered with a crowded network of molded projections and recesses presenting to the unvulcanized rubber of such a bonding layer a large contact surface and a multitude of cavities into which the unvulcanized rubber of such a bonding layer can flow during the performance of such permanent-bonding method.

3,970,132

TIRE CHAIN ASSEMBLY

Victor S. Giannone, 952 Central Ave., Peekskill, N.Y. 10566

Filed July 2, 1975, Ser. No. 592,629

Int. Cl.² B60C *27/10, 27/02*

U.S. Cl. 152—233 **3 Claims**

1. An adjustable tire chain assembly comprising:

inboard and outboard flexible strap ropes, each of said strap ropes having loop ends;

clasp means for connecting said loop ends releasably together;

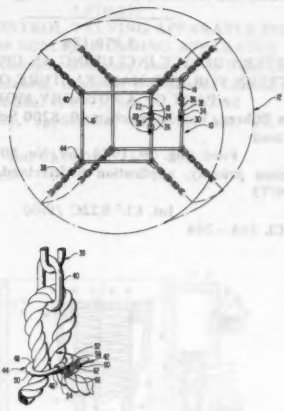
link chains extending between the inboard and outboard strap ropes at spaced locations, said link chains having terminal links at each end thereof, and the strap ropes extending between said terminal links on the inboard and outboard ends respectively thereof;

a series of adjustment clamps for the strap ropes to tightly engage the assembly on a vehicle wheel, said adjustment clamps each comprising a band having side sections and end sections, a hinge sleeve pivotally mounted on one of said side sections, and a lever on said sleeve;

the lever being concave in the direction of the band, and having a release handle extending in the opposite direction; and

the strap ropes having loops thereof extended through said handle adjacent said locations where the link chains are located, the bands being slidable on said loops to posi-

tions effecting tight connection of the tire chain assembly on the wheel, and the levers being pivotal to locking



positions which wedge the strap ropes and bands together.

3,970,133

CHLOROTHIO-SULFONAMIDE-MODIFIED RUBBERY TERPOLYMERS AND THEIR BLENDS

Roger J. Hopper, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Division of Ser. No. 532,979, Dec. 16, 1974, Pat. No. 3,915,907. This application Oct. 17, 1975, Ser. No. 623,223

Int. Cl.² B60C *13/00*; **C08L** *7/00*, *9/02*, *9/06*

U.S. Cl. 152—353 R **2 Claims**

1. A pneumatic tire casing of toroidal shape, with outer tread portion and spaced beads and having a sidewall connecting said tread portion and bead, said sidewall comprised of a sulfur-cured composite comprised of 100 parts by weight of modified rubbery terpolymer in admixture with about 18 to about 670 parts by weight of a rubbery polymer comprised of at least one of cis-1,4-polyisoprene natural rubber, synthetic cis-1,4-polyisoprene, polybutadiene, butadiene-styrene copolymer with a butadiene/styrene mole ratio in the range of about 60/40 to about 95/5, butadiene acrylonitrile copolymer, polypentenamer of the type derived from open ring polymerization of cyclopentene, bromobutyl rubber, chlorobutyl rubber and polychloroprene, where said modified rubbery terpolymer is comprised of the admixture product of a rubbery terpolymer of ethylene, propylene, in a mole ratio in the range of about 30/70 to about 70/30, and about 0.1 to about 0.8 mole of non-conjugated diene per kilogram of terpolymer, and an N-chlorothio-sulfonamide, where said non-conjugated diene is selected from 1,4-hexadiene, dicyclopentadiene, 5-ethylidene-2-norbornene, 5-methylene-2-norbornene, 4,7,8,9-tetrahydroindene and 1,5-cyclooctadiene, and where said N-chlorothio-sulfonamide is selected from:

N-chlorothio-N-methyl-methanesulfonamide,
N-chlorothio-N-methyl-benzenesulfonamide,
N-chlorothio-N-methyl-p-toluenesulfonamide,
N-chlorothio-N-ethyl-p-toluenesulfonamide,
N-chlorothio-N-methyl-ethanesulfonamide,
N-chlorothio-N-phenyl-p-toluenesulfonamide,
N-chlorothio-N-(2-propyl)-methanesulfonamide,
N-chlorothio-N-(1-propyl)-p-chlorobenzenesulfonamide,
N-chlorothio-N-phenyl-methanesulfonamide,
N-chlorothio-N,N′,N′-trimethylsulfamide,
N-chlorothio-N-methyl-N′,N′-(pentamethylene)sulfamide,
N-chlorothio-N-methyl-N′,N′-diethylsulfamide and
N-chlorothio-N-phenyl-benzenesulfonamide

where the mole ratio of said N-chlorothio-sulfonamide to unsaturated sites in said terpolymer is in the range of about 0.06/1 to about 1/1.

3,970,134

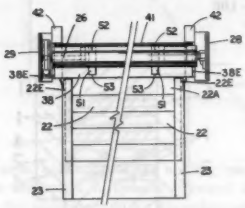
SECURITY LOCKING OF ROLLING SHUTTERS

Pomeroy Sinnock; Joseph Robert Lauer; David H. Manthei, all of New Castle, and Arthur C. Rugg, Richmond, all of Ind., assignors to Amrol Corporation, New Castle, Ind.

Filed July 16, 1975, Ser. No. 596,209

Int. Cl.² E06B *9/08*

U.S. Cl. 160—133 **12 Claims**



1. In a rolling shutter having a plurality of parallel, adjacent shutter slats capable of deployment in a shutter-closed array covering an opening in a building wall, and of being roiled from the array onto a roller for a shutter-open condition to uncover the opening and for storage of the shutter slats in a roll, the improvement comprising:

a plurality of lock slats connected to the roller between the roller and the shutter slats;

lock slat guide means adjacent said roller and disposed in position to guide the lock slats and prevent disorder thereof but clear said shutter slats to accommodate accumulation thereof in a roll on said roller.

3,970,135

METHOD FOR APPLYING FLUX POWDER TO THE BATH LEVEL IN A CONTINUOUS CASTING MOLD DURING CONTINUOUS CASTING

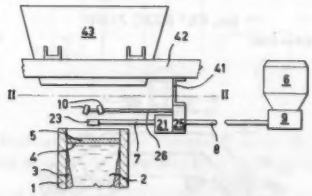
Markus Schmid, and Werner Bruderer, both of Zurich, Switzerland, assignors to Concast AG, Zurich, Switzerland

Filed May 20, 1974, Ser. No. 471,762

Claims priority, application Switzerland, May 30, 1973, 7799/73

Int. Cl.² B22D *11/16*

U.S. Cl. 164—4 **7 Claims**



1. A method for the application of a casting agent to the bath level of liquid metal within a mold during continuous casting, comprising the steps of: monitoring the distribution of the casting agent at the surface of the bath level, obtaining monitoring results regarding the distribution of the casting

agent, and controlling at least the infed quantity of the casting agent at the bath level as a function of such monitoring results.

3,970,136

METHOD OF MANUFACTURING COMPOSITE MATERIALS

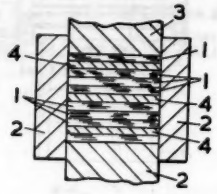
John Corjeag Cannell, Waltham Abbey; Rodney Seymour Leaper, Hoddesdon, and Noel James Parratt, Loughton, all of England, assignors to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

Continuation of Ser. No. 231,594, March 3, 1972, abandoned. This application Mar. 14, 1975, Ser. No. 558,475

Claims priority, application United Kingdom, Mar. 5, 1971, 6093/71

Int. Cl.² B22D *19/02*

U.S. Cl. 164—108 22 Claims



1. A process for forming a composite material comprising a metal matrix incorporating non-metallic fibrous reinforcement having a predetermined pattern of fiber orientation which includes the steps of:

a. providing in a mold a plurality of layers of fibers formed from at least one array of substantially coplanar fibers,

b. providing reservoirs of molten matrix metal between at least some of the layers of fibers, and

c. forcing said molten metal to penetrate said layers and intimately to surround substantially each of the fibers by applying pressure to the mold contents, sufficient matrix metal reservoirs being provided for the separation between neighboring reservoirs to be within twice the distance that the molten metal can penetrate before solidification under the applied temperature and pressure.

3,970,137

APPARATUS FOR PRODUCING AND TRANSFERRING CASTING MOULDS

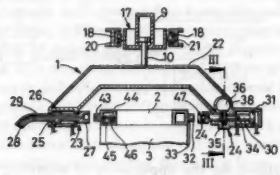
Herbert Grolla, Laasphe, Westphalia, Germany, assignor to Heinrich Wagner Maschinenfabrik, Laasphe, Westphalia, Germany

Filed Feb. 10, 1975, Ser. No. 548,600

Claims priority, application Germany, Feb. 15, 1974, 2407264

Int. Cl.² B22C *25/00*

U.S. Cl. 164—160 4 Claims



1. Apparatus for producing and transferring casting moulds utilising binderless sand subjected to a reduced pressure, said apparatus comprising a travelling gripper which is arranged to be raised and lowered and which is provided with two couplings to hold a moulding box, said couplings being rotatable about a horizontally extending axis, and one coupling being connected to a vacuum pipe for evacuating the moulding box.

3,970,138

PATTERN DEVICE INCLUDING AN UPPER TROUGH PATTERN FOR THE MANUFACTURE OF THE UPPER PART OF A FOUNDRY MOLD

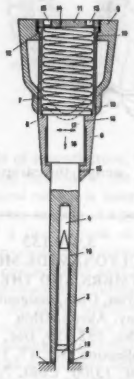
Erwin Bührer, Vogelingasschen 40, 8200 Schaffhausen, Switzerland

Filed Aug. 29, 1974, Ser. No. 501,817

Claims priority, application Switzerland, Sept. 5, 1973, 12759/73

Int. Cl.² B22C *19/00*

U.S. Cl. 164—244 8 Claims



1. In a pattern device for the production of the upper part of a foundry mold including a mold pattern, an upper trough pattern configured to form a trough with a trough basin, and at least two gate pins configured to form at least two gates extending from said trough, with said trough connecting said basin with said gates, said mold being subject to compaction after filling thereof with mold forming material, the improvement comprising a first guide pin fixed to said mold pattern and extending longitudinally therefrom into said upper mold part, wall means defining a guide hole in at least one of said gate pins, said first guide pin being fitted into said guide hole to retain said pattern device in place during production of said upper mold part, said first guide pin including a lower guide wall portion generally proximate said mold pattern and an upper guide wall portion located proximate the opposite end thereof and spaced from said lower guide wall portion, said guide hole being configured to firmly engage said first guide pin about said lower guide wall portion and said upper guide wall portion to impede lateral deflection of said at least one gate pin when said mold is subjected to compaction forces, with said wall means and said guide pin being shaped to define a longitudinally extending annular spacing therebetween extending continuously from said lower guide wall portion to said upper guide wall portion, said first guide pin having a predetermined diameter and a predetermined distance between said upper and lower guide wall portions, with said first guide pin diameter and said distance between said upper and lower guide wall portions being dimensioned in accordance with the magnitude of the lateral displacement forces exerted against said at least one gate pin during compaction of said mold, another of said gate pins having a guide hole therein, and a second guide pin spaced from said first pin and fixed to

said mold pattern at a location to engage said guide hole in said another of said gate pins.

3,970,139

VACUUM CONTROL VALVING APPARATUS FOR A VACUUM SEALED MOLDING APPARATUS

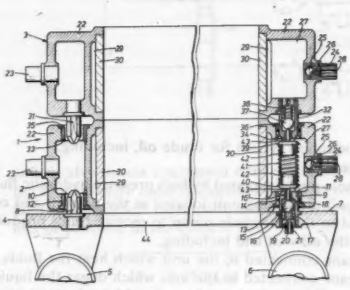
Herbert Grolla, Laasphe, Germany, assignor to Heinrich Wagner Maschinenfabrik, Laasphe, Westphalia, Germany

Filed Jan. 6, 1975, Ser. No. 538,794

Claims priority, application Germany, Jan. 22, 1974, 2402870

Int. Cl.² B22C 11/12, 9/02

U.S. Cl. 164—253 10 Claims



1. In a vacuum molding apparatus having a rail conveyor truck with a vacuum source connection thereon and a casting box for producing castings with the aid of binderless sand, said apparatus being comprised of frame-like upper and lower mold members each having an evacuation chamber, the improvement comprising wherein said evacuation chambers have first coupling means for connection to a vacuum source separate from said vacuum source connection on said rail conveyor truck and first normally closed valve means in said first coupling means and connected in circuit therewith for opening and closing said vacuum source connection, said first valve means being opened in response to the application of a vacuum pressure to said first coupling means, said upper and lower mold members each having second coupling means communicating with said evacuation chambers and second valve means for opening and closing said communication to said evacuation chambers, said second valve means being normally closed when said upper and lower mold members are separated from each other, first actuating means for opening said second valve means in response to a placement of said upper mold member in mating relation on top of said lower mold member to establish communication between said evacuation chambers, and third coupling means communicating with said evacuation chamber in said lower mold member and third valve means for opening and closing said communication to said evacuation chamber, said third valve means being normally closed when said lower mold member is separated from said rail conveyor truck, second actuating means for opening said third valve means in response to a placement of said lower mold member in mating relation on top of said rail conveyor truck and connecting said evacuation chamber in said lower mold member to a vacuum source connection on said rail conveyor truck.

3,970,140

AIR OPERATED UNDERGROUND COOLER MEANS WITH NATURAL LIFT

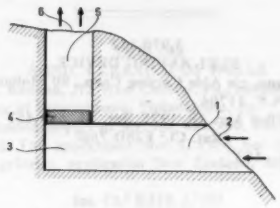
László Heller; László Forgó, and Árpád Bakay, all of Budapest, Hungary, assignors to Transelektro Magyar Villamossagi Kulkereskedelmi Vallalat, Budapest, Hungary

Continuation of Ser. No. 286,515, Sept. 5, 1972, abandoned. This application Oct. 11, 1974, Ser. No. 514,149

Claims priority, application Hungary, Sept. 4, 1971, EE-1961

Int. Cl.² F28B 5/00

U.S. Cl. 165—45 3 Claims



1. An industrial plant employing cooling means dependent solely on the difference in density between heated air and unheated air for movement of air therethrough, said cooling means comprising an underground passage having an inlet orifice and an outlet orifice opening into the ambient air, said passage comprising a first essentially vertical shaft having upper and lower ends, said upper end terminating proximate said outlet orifice, a second essentially horizontal shaft having inner and outer ends, said inner end communicating with said lower end of said essentially vertical shaft, and said outer end terminating in said inlet orifice, and heat transfer means located at least in part proximate the lower end of said first shaft, the length of said first shaft being substantially greater than the length of said heat transfer means, and said heat transfer means consisting of surface cooler means extending essentially across the entire cross-sectional area of said first shaft.

3,970,141

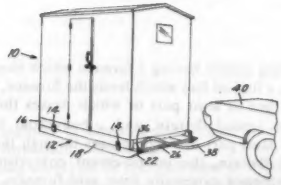
DISLODGING DEVICE

Roger J. Raether, Ortonville, Minn., assignor to Erwin F. Wellendorf, Ortonville, Minn.

Filed May 27, 1975, Ser. No. 580,974

Int. Cl.² F24H 3/00

U.S. Cl. 165—47 1 Claim



1. A heat radiating frame mountable under the base of an ice fishing structure for dislodging the same from ice, comprising:

a pair of spaced opposed elongate generally parallel metal skids;

said skids each being hollow along its length,

a pair of spaced opposed connector members respectively joined near the end thereof adjacent to the end of one of said skids to form a frame with each of said skids coinciding with opposite sides of the base of said structure,

said connector members each being hollow along its length with said skids extending more deeply than said connector members,

an exterior inlet port and an outlet port disposed adjacent one another and communicating with the interior of said frame,

interior ports at the junction between said skids and connector members to provide a continuous path through and about the interior of said frame from one of said ports to the other,

means for directing pressurized hot gas along said path, and

means on said frame for retaining the structure thereon as said frame is dragged upon said skids.

3,970,142

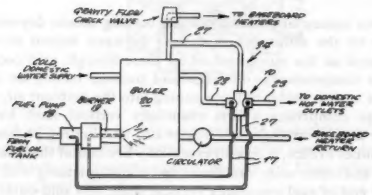
FUEL SAVING DEVICE

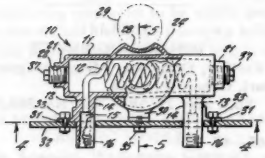
Joseph Troiano, c/o Able Carting Corp., 80 Mahan St., West Babylon, N.Y. 11704

Filed Apr. 18, 1975, Ser. No. 569,457

Int. Cl.[2] F28D *7/00*

U.S. Cl. 165—163 **4 Claims**





1. In a heating system having a furnace which burns fuel to produce heat, a fuel oil line which feeds the furnace, a domestic hot water line at least part of which passes through the furnace to be heated therein, and a household baseboard heater line at least part of which passes through the furnace to be heated therein, the improvement comprising a fuel preheater positioned externally from said furnace, said preheater formed as a single unitary part and containing a narrow pipe and wide pipe, said narrow pipe being perpendicular to and extending transversely through said wide pipe, a coil of tubing located within said narrow pipe, connection means at each end of said coil tubing for connection along said fuel oil line at a part thereof prior to its feeding into the furnace, connection means at each end of said narrow pipe for connection along said domestic hot water line at a part thereof located subsequent said furnace, and connection means at each end of said wide pipe for connection to said household baseboard heater line at a part thereof subsequent to said furnace.

3,970,143

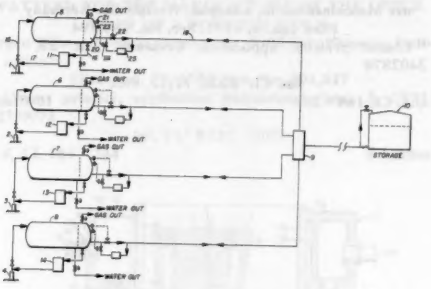
OIL WELL PRODUCTION SYSTEM

Sammy DeWitt Thrash, Tulsa, Okla., assignor to Combustion Engineering, Inc., New York, N.Y.

Filed June 23, 1975, Ser. No. 589,329

Int. Cl.[2] E21B *43/00*

U.S. Cl. 166—53 **2 Claims**



1. A production system for crude oil, including;

an oil well;

a downhole pump actuated by high pressure hydraulic fluid;

a crude oil processing unit located at the oil well and connected to the downhole pump to receive fluids produced from the oil well and including,

a. means connected to the unit which heat the fluids,

b. means connected to the unit which degas the liquids,

c. means connected to the unit which electrostatically separate the liquids into clean crude oil and water,

d.and a compartment within the unit arranged to receive the clean crude oil;

a high pressure pump connected to the clean oil compartment to receive the clean oil and connected to the downhole pump to supply the clean oil as the actuating hydraulic fluid;

a storage facility connected to the clean oil compartment to receive all the clean oil processed in excess of the quantity received by the high pressure pump;

and a control system connected between the storage facility and clean oil compartment and arranged to return processed clean crude oil to the high pressure pump from the storage facility during periods when the oil well output of the processing unit is less than the amount required to actuate the downhole pump.

3,970,144

SUBSURFACE SHUTOFF VALVE AND CONTROL MEANS

Robert O. Boykin, Jr., P.O. Box 5151, Midland, Tex. 79701

Filed Aug. 11, 1975, Ser. No. 603,306

Int. Cl.[2] E21B *43/12*

U.S. Cl. 166—53 **15 Claims**

1. A shutoff control system for a producing string extending within a well bore, comprising:

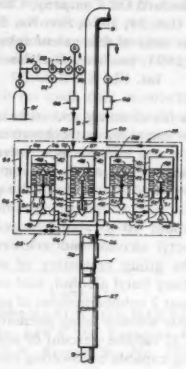
a. a shutoff valve interposed in the producing string, the valve including a control chamber which, when subjected to a pressure that exceeds the internal pressure by a preselected differential, causes the shutoff valve to close, so as to stop all flow through the producing string;

b. a pressure fluid reservoir carried by the producing string, connected to the shutoff valve control-chamber and having a pressure-fluid capacity capable of pressurizing the shutoff valve control chamber sufficiently to effect closure of the shutoff valve;

c. a control line extending from the reservoir to the surface, at or near the wellhead;

d. a source of pressure fluid connectable to the control line for supplying pressure fluid to the reservoir;

e. a check valve preventing return flow of pressure fluid from the reservoir;

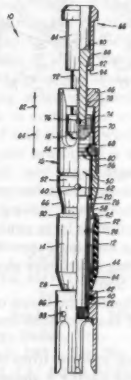


f. and a valve means interposed between the reservoir and the shutoff-valve control-chamber for supplying pressure fluid to the shutoff-valve control-chamber in the event of loss of pressure in the control line.

3,970,145
STANDING VALVE ASSEMBLY

Gerald K. Boyd, Kingfisher, Okla., assignor to Production Service & Equipment Incorporated, Kingfisher, Okla.

Filed Sept. 29, 1975, Ser. No. 617,867
Int. Cl.² E21B *33/12*
U.S. Cl. 166—188 **7 Claims**

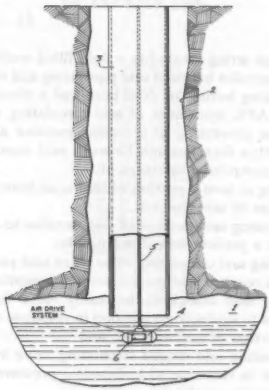


1. A standing valve for use in a tubing string, comprising:
a mandrel having an upper end, a lower end, and a bore therethrough communicating between the upper and lower ends thereof;
a packing element having a lower end sealingly connected around the mandrel between the upper and lower ends thereof, and an upper end circumferentially disposed between, and spaced from, the mandrel and the tubing string;
a valve body slidably retained on the mandrel between the packing element and the upper end of the mandrel, the valve body having an upper end, a lower end and a bore therein in fluid communication with the bore through the mandrel, and being slidable in a first direction to move the lower end thereof into the packing element between the upper end of the packing element and the mandrel to wedge the upper end of the packing element into sealing engagement with the tubing string; and,
a valve slidably retained in the bore through the valve body, the valve being slidable in the first direction to close the bore through the valve body, and in a second direction substantially opposite to the first direction to open the bore through the valve body.

3,970,146
SONIC CLEANING OF WELLS

Bernard J. Keenan, Jr., West Chester, Pa., assignor to Sun Oil Company of Pennsylvania, Philadelphia, Pa.

Continuation-in-part of Ser. No. 421,906, Dec. 5, 1973, abandoned. This application Nov. 1, 1974, Ser. No. 519,961
Claims priority, application New Zealand, Sept. 2, 1974, 175302
Int. Cl.² E21B *37/00*
U.S. Cl. 166—249 **1 Claim**



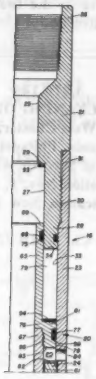
1. A method of cleaning a well pipe penetrating a fluid bearing formation comprising:
a. adding diesel oil to the well pipe to maintain the liquid level at the desired level in the well pipe;
b. placing a sonic generator with an air drive self propulsion unit below the liquid level in said well pipe;
c. producing sound waves with the sonic generator in the liquid at sufficient intensity to break up residual tars and deposits inside the well pipe;
d. activating the self propulsion unit so that the sonic generator is propelled through the entire length of pipe to be cleaned; and
e. removing said deposits by means of fluid flow through said well pipe from said fluid bearing formation.

3,970,147

METHOD AND APPARATUS FOR ANNULUS PRESSURE RESPONSIVE CIRCULATION AND TESTER VALVE MANIPULATION

Robert L. Jessup, Duncan, Okla., and Joe E. Coleman, New Orleans, La., assignors to Halliburton Company, Duncan, Okla.

Filed Jan. 13, 1975, Ser. No. 540,361
Int. Cl.² E21B *21/00*, *47/06*
U.S. Cl. 166—250 17 Claims



1. In a pipe string located in a fluid filled wellbore so as to provide an annulus between said pipe string and said wellbore, said pipe string having an axial bore and a circulating valve, method of APR movement of said circulating valve from a first position preventing to a second position allowing fluid communication therethrough between said annulus and said axial bore, comprising the steps of:

a. isolating at least a portion of said axial bore from at least a portion of said annulus;

e. pressurizing said portion of said annulus to a pressure of at least a predetermined magnitude;

f. unlocking said circulating valve when said pressure of said portion reaches said predetermined magnitude;

g. moving said unlocked circulating valve from said first position to said second position in response to pressure in said portion of said annulus; and

h. maintaining said moved circulating valve in said second position in response to hydrostatic pressure in said portion of said annulus.

9. Apparatus for circulation of well fluids in response to pressure in an isolated portion of an annulus between the apparatus and a surrounding well bore, comprising:

a. a cylindrical housing having an axial interior bore and a passageway commmunicating the axial interior bore with the exterior of the housing;

b. a valve body carried by said housing and movable between a first position closing said passageway and a second position opening said passageway;

c. a first locking means for locking said valve body in said first position to said housing, and for unlocking said valve body from said housing upon a predetermined pressure applied to said valve body; and

d. piston means, attached to said valve body, for applying the pressure in said isolated portion of said annulus to said valve body, for moving said valve body to said second position upon the release of said first locking means and for maintaining said valve body in said second position in response to normal hydrostatic pressure in said isolated portion.

3,970,148

METHOD FOR STIMULATING WELLS COMPLETED IN OIL BEARING EARTH FORMATIONS

Loyd W. Jones, and George B. Holman, both of Tulsa, Okla., assignors to Standard Oil Company, Chicago, Ill.

Filed Oct. 29, 1974, Ser. No. 518,441
The portion of the term of this patent subsequent to June 25, 1991, has been disclaimed.
Int. Cl.² E21B *43/27*
U.S. Cl. 166—307 11 Claims

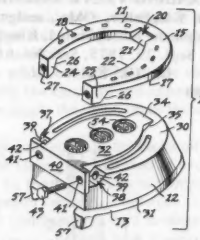
1. In a process for cleaning and stimulating an oil, gas or injection well the improvement comprising introducing into said well an aromatic hydrocarbon solvent and thereafter injecting into said well an acidizing composition consisting essentially of from 30 to about 76 volume percent of an aqueous solution of a well acidizing nonoxidizing water-soluble acid and from about 70 to about 24 volume percent of a mixture of an octyl alcohol and a lower aliphatic alcohol selected from the group consisting of ethanol, the propyl alcohols and tertiary butyl alcohol, said octyl alcohol constituting at least about 2 volume percent of said composition and said lower aliphatic alcohol being present in a concentration of at least about 22 volume percent of said composition, said composition being capable of lowering the interfacial tension between the oil in said formation and said composition without the use of an added surface-active agent.

3,970,149

HORSESHOE

Sammie W. Featherstone, 2232 Maplecrest Drive, Donelson, Tenn. 37214

Filed Feb. 13, 1975, Ser. No. 549,464
Int. Cl.² A01L *1/00*
U.S. Cl. 168—25 4 Claims



1. A horseshoe comprising:

a. a C-shaped upper shoe member resembling the shape of a conventional horseshoe, having top and bottom surfaces, a front portion, a large central opening, and separate rear portions forming depending calk members,

b. means for securing said upper shoe member to the bottom of a horse's hoof,

c. a body member having the shape of a hoof extension and having front and rear portions and top and bottom surfaces,

d. a boss projecting upward from the top surface of said body member and having a shape similar to the central opening in said upper shoe member for snug reception within said central opening in operative position, said boss projecting rearward between said calk members in operative position,

e. a first latch element on the front portion of said upper shoe member,

f. a second latch element on the front portion of said body member to latch the top surface of said body member flush against the bottom surface of said upper shoe member in operative position,

g. separate recesses formed in the rear portion of the top surface of said body member on opposite sides of said

boss, each recess receiving a corresponding calk member in operative position,

h. a T-bar member fixed to the rear end portion of said boss and projecting transversely behind said recesses,

i. aligned threaded apertures through each depending calk member and its corresponding recess,

j. a registering aperture in each projecting portion of said T-bar aligned with said corresponding threaded apertures,

k. a threaded bolt for each calk member for registry with said aligned apertures to secure each of said calk members in its corresponding recess in operative position,

l. a lower shoe member having the general shape of a conventional horseshoe including a top surface conforming to the bottom surface of said body members, and

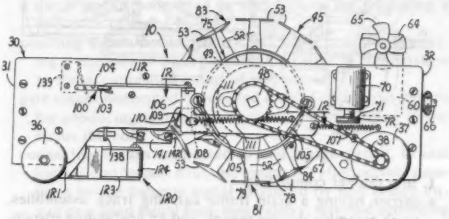
m. means for securing the top surface of said lower shoe member flush against the bottom surface of said body member in operative position.

3,970,150

METHOD AND APPARATUS FOR HARVESTING CROPS

Robert R. Gibson, Jr., 649 'C' St., Lemoore, Calif. 93245, and Joo I. Kim, 5275 N. Fresno St., No. 102, Fresno, Calif. 93710

Filed Dec. 5, 1974, Ser. No. 529,802
Int. Cl.² A01D *23/06*
U.S. Cl. 171—56 **17 Claims**



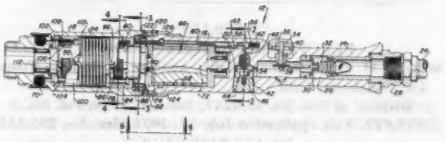
11. An apparatus for harvesting the mature growth of a crop, the apparatus comprising a frame having a picking station and adapted for movement relative to the crop to cause the growths of the crop to be passed in relative movement through the picking station; pairs of arms pivotally borne by the frame for picking the growths; means affixed on the frame for individually sensing mature growths; and guide means mounted on the frame in connection with the sensing means for urging said arms of said pairs toward each other and into the picking station, upon sensing of a mature growth by the sensing means, to pick said mature growth in the picking station, and resilient means between said arms resisting said movement toward each other.

3,970,151

TORQUE RESPONSIVE MOTOR SHUTOFF FOR POWER TOOL

William Workman, Jr., Spring Lake, Mich., assignor to Gardner-Denver Company, Dallas, Tex.

Filed July 3, 1975, Ser. No. 592,838
Int. Cl.² B23B *45/04*
U.S. Cl. 173—12 **11 Claims**



1. A power tool for tightening threaded fasteners and the like comprising:

housing means;

a pressure fluid operated motor disposed in said housing means;

valve means disposed in said housing means and operable to shut off the flow of pressure fluid through said motor;

drive mechanism including a planetary gear unit connected to said motor for rotatably driving a threaded fastener;

a first member disposed in said housing means and interposed in said drive mechanism, said first member comprising a rotatable ring gear of said planetary gear unit and a cam disposed on said first member and rotatable with said ring gear in response to a reaction torque imposed on said ring gear which is proportional to the torque exerted on said fastener;

a cam follower disposed for engagement by said cam and responsive to the rotation of said ring gear to effect actuation of said valve means to shut off the flow of pressure fluid through said motor at a predetermined torque exerted on said fastener; and,

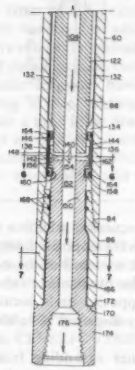
a torsion coil spring disposed in said housing means and connected to said first member and being operable to be deflected from a substantially relaxed condition in response to rotation of said ring gear regardless of the predetermined torque at which motor shutoff is to be effected.

3,970,152

MUD ACTUATED DRILLING TOOL

Jesse W. Harris; Ross Bassinger, and Grey Bassinger, all of San Antonio, Tex., assignors to Bassinger Tool Enterprises, Ltd., San Antonio, Tex.

Filed June 14, 1974, Ser. No. 479,369
Int. Cl.² E21B *1/06*
U.S. Cl. 173—15 **15 Claims**



1. A fluid actuated impact drilling tool for use in rotary drilling comprising:

housing means;

means for connecting said housing means in a string of drilling pipe;

flow means through said housing means for allowing a fluid flowing in said drilling pipe to flow through said housing means;

single valve means slidably mounted in said housing means;

hammering means slidably mounted in said housing means, said single valve means and said hammering means moving independently of and relative to each other for periodically interrupting substantial flow of said fluid in said flow means by first moving along the axis of said drilling tool until both reach a plane perpendicular to said axis, said interruption of said fluid causing an increase in pressure of said fluid above said plane which drives both said

single valve means and hammering means in the direction opposite the first direction of movement along said axis;

said first movement of said single valve means and said hammering means being caused by a pressure differential between the fluid inside said flow means and outside of said housing means, pressure causing said pressure differential acting on given surfaces of said single valve and hammering means as defined by pressure areas enclosed by seal means; and

said housing means including an upper and a lower end with said fluid flowing in said upper end, through said housing means and out said lower end thereof, said hammer means forming a portion of said flow means that is in continuous and uninterrupted communication with said lower end of said housing means.

3,970,153

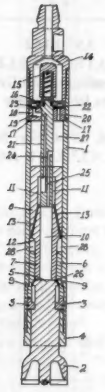
PNEUMATIC PERCUSSION MACHINES

Abraham Gien, and Bernard Lionel Gien, both of P.O. Box 196, Swartruggens, Transvaal, South Africa

Filed Jan. 20, 1975, Ser. No. 542,411

Int. Cl.[2] E21B *1/06*

U.S. Cl. 173—17 **5 Claims**



1. A pneumatic percussion machine including:

a hollow casing having opposite ends;

a valve assembly at one end of the casing;

a bit assembly at the other end of the casing;

a piston having opposite ends located in the casing and having an axially disposed bore extending the length of the piston;

a projecting member extending from the valve assembly into the bore of the piston and along which member the piston is adapted to reciprocate;

a first member chamber formed between one end of the piston and the valve assembly;

a second chamber formed in the vicinity of the other end of the piston between the piston and the casing,

a first fluid supply path through the valve assembly to the first chamber;

a second fluid supply path extending over a portion of its length through the valve assembly and projecting member and, for the remaining portion of its length, through the piston to the second chamber, such portions of the second fluid supply path being brought into communication with each other over a limited range of positions of the piston along the projecting member; and

a fluid exhaust path from the first chamber through the projecting member into the bore of the piston and then out through the casing end fitted with the bit assembly, such fluid exhaust path being open over a limited range of positions of the piston along the projecting member; the piston being movable, as the valve assembly alternatively opens the first and second fluid supply paths, between a first position in which:

the piston is in contact with the bit assembly,

the second fluid path is open to the second chamber; and

the fluid exhaust path is open; and a second position, displaced towards the valve assembly from the first position, in which the first fluid supply path is open to the first chamber.

3,970,154

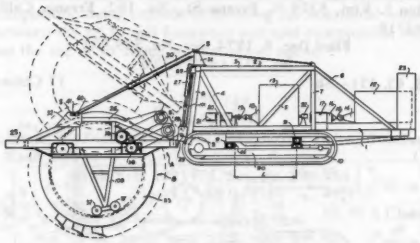
TOOL POWER SYSTEM USABLE AS SUBSTITUTE FOR VEHICLE PROPULSION

Fred Willie Bartels, Edmonton, Canada, assignor to Banister Pipelines, Ltd., Edmonton, Canada

Division of Ser. No. 343,107, March 20, 1973, Pat. No. 3,863,988. This application Aug. 23, 1974, Ser. No. 500,091

Int. Cl.[2] E02F *5/02*

U.S. Cl. 173—24 **1 Claim**



1. In a ditcher comprising

a carrier having a main frame carrying track assemblies, track assembly driving means, and an upstanding suspension frame secured to said main frame,

a rigid wheel frame carrying a rotatable digging wheel, conveyor, and conveyor driving means, said wheel frame being pivotally connected at its front end to the suspension frame and movable thereon between a lowered position and an elevated position, and

means for raising and lowering the wheel frame between said positions,

the improvement which comprises:

first engine means mounted on the carrier;

mechanical wheel drive means for rotating the digging wheel;

first hydraulic means, actuated by the first engine means, operatively connected to the wheel drive means;

second engine means mounted on the carrier;

second hydraulic means actuated by the second engine means, operatively connected to the track assembly driving means, conveyor driving means, and raising and lowering means; and

selectively operable cross-over means connecting the first and second hydraulic means to enable the first hydraulic means to actuate the track assembly driving means and the raising and lowering means.

3,970,155

ELECTRONIC TORQUE WRENCH

William M. Otto, Orange, Calif., assignor to Jo-Line Tools, Inc., Anaheim, Calif.

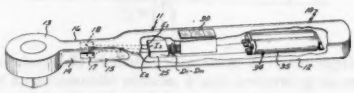
Division of Ser. No. 433,247, Jan. 14, 1974, Pat. No. 3,895,517. This application July 11, 1975, Ser. No. 595,135

Int. Cl.[2] B25B *23/14*

U.S. Cl. 73—139 **6 Claims**

1. A torque wrench comprising, in combination:

a wrench head;
a handle structure including an internal cavity at one end thereof and a beam section secured to said wrench head at the other end thereof;
a battery insertable into said internal cavity;
a pair of strain gages respectively attached to the opposed lateral surfaces of said beam section including a first and second resistive element connected in series and adapted to register strain deformation of said beam section in the form of resistive change;
resistive means connected across said first and second resistive elements to form a bridge circuit in combination therewith;
excitation means connected to said bridge circuit and to said battery for electrical excitation of said bridge circuit in a first and second polarity;
switching means connected to said excitation means for alternatively selecting said first or second excitation polarity according to the state of a received switching signal;



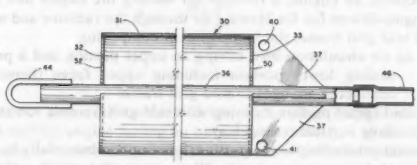
a clock circuit connected to said battery for producing a sequence of timed pulses;
counting means connected to said clock circuit for producing a plurality of binary signals indicative in combination to the accumulated count of said pulses;
gate means connected to selected ones of said binary signals for producing said switching signal corresponding to the status thereof;
connecting means connected to said bridge circuit, to said battery and to said counting means for alternatively passing a bridge balance signal produced by said bridge circuit or a fixed signal from said battery, selected according to the status of selected other ones of said binary signal;
accumulating means connected to said connecting means for accumulating in a first direction said bridge balance signal and in a second direction said fixed signal connected to said counting means and said accumulating means; and
readout means for displaying the accumulated count in said second direction.

3,970,156

WATER WEIGHTED CORER

Shale Jack Niskin, Miami, Fla., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sept. 15, 1975, Ser. No. 613,703
Int. Cl.² E21B *7/12*
U.S. Cl. 175—6 **7 Claims**



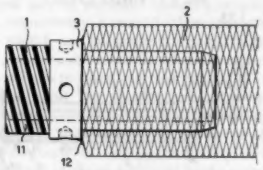
6. An inherently stable free fall coring device comprising:
a body portion for providing the driving force of the device; and
structural means centrally disposed in said body portion and including a coring tube attached at the end thereof first entering the water and a bail attached at the end remote from said coring tube,
said body portion adapted to receive ambient water therein during the initial phase of free fall,
said received water forming substantially the entire weight required to drive said coring tube a selected distance into bottom sediment.

3,970,157

RAM-BORER APPARATUS

Paul Schmidt, Lennestadt, Germany, assignor to Tracto-Technik, Lennestadt, Germany

Filed July 30, 1973, Ser. No. 384,069
Claims priority, application Germany, Aug. 30, 1972, 2242605
Int. Cl.² E21B *11/02*; F16L *1/02*
U.S. Cl. 175—22 **5 Claims**



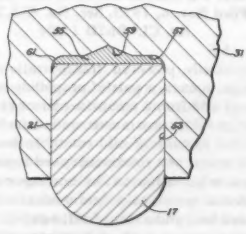
1. A self-propelled pneumatic ram-borer apparatus, particularly suitable for effecting trial borings, comprising, in combination, a tubular housing having a forward end and a rearward end, a percussion piston reciprocally movable within said housing, a percussion tip arranged in said housing for axial displacement therein, said percussion tip being disposed to receive impact forces from said percussion piston to effect said trial borings and to bear against said housing, a resilient member interposed between said percussion tip and said housing through which said percussion tip bears against said housing, and a braided metallic drag-sock having an end connected to said tubular housing at the rearward end thereof and adapted to engage about a tube to be drawn through said trial borings, with said end of said drag-sock connected to said housing having an outer diameter which is approximately equivalent to the outer diameter of said tubular housing.

3,970,158

TOOTH LOADING FOR EARTH BORING BITS

Bill Adby Black, and Johannes Gerardus Leon Eenink, both of Houston, Tex., assignors to Hughes Tool Company, Houston, Tex.

Filed Apr. 28, 1975, Ser. No. 572,545
Int. Cl.² E21C *13/00*
U.S. Cl. 175—410 **12 Claims**



1. An improved earth boring bit comprising a metal body, teeth formed of hard metal inserts secured interferringly in a circular row or drilled holes in the body to engage the bottom

of a borehole, a deformable pad under said inserts and in contact with said inserts and the mating associated interferring holes, the volume of the pad being greater than the remaining voids between the hole, the pad, and assembled insert upon initial assembly, and the hardness of the pad being less than that of the metal defining said holes, whereby the pad during drilling and repetitive loading fills said voids between the insert, the pad, and hole.

3,970,159
DOSING DEVICE FOR PNEUMATIC DELIVERY SYSTEMS

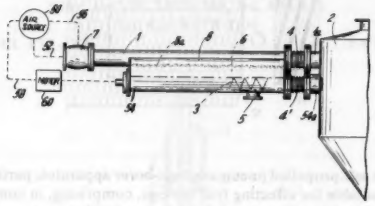
Horst Hahn, Offenbach am Main, Germany, assignor to Firma F. J. Gattys Verfahrenstechnik GmbH, Germany

Filed Aug. 4, 1975, Ser. No. 601,534

Claims priority, application Germany, Aug. 12, 1974, 2438699

Int. Cl.² G01G *13/10*

U.S. Cl. 177—123 **8 Claims**



1. A dosing device for pneumatic delivery systems particular for handling powdery granular and similar materials, comprising a first delivery tube portion defining a first conduit portion for coarse dosing having a coarse dosing discharge, a second delivery tube portion defining a second conduit portion for fine dosing having a fine dosing discharge, means establishing a communication between said first and second conduits, screen means disposed in the communication between said first and second conduits for the passage of materials of selected size therethrough, valve means associated with said first delivery tube at a spaced location from said coarse dosing discharge for isolating said delivery tube from the pneumatic delivery system, and feed means associated with said second conduit for delivering material in said second conduit out through said fine dosing discharge after said valve means is closed.

3,970,160
CONTROL MEANS FOR ELECTRICALLY POWERED TRANSPORTATION MEANS

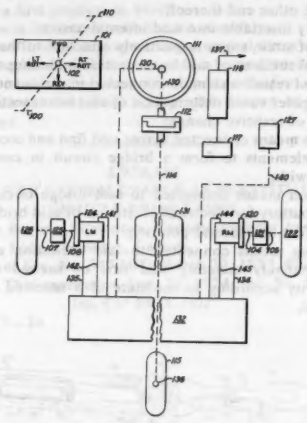
William Nowick, 1-B Plateau Place, Greenbelt, Md. 20770

Filed Nov. 6, 1973, Ser. No. 413,377

Int. Cl.² B62D *11/04*

U.S. Cl. 180—6.5 **14 Claims**

1. An electrically powered transportation means which comprises frame means, a pair of propelling rotatable means on each side of said frame means, a pair of synchronous motors mounted on said frame means, one of each of said motors being connected to each of said rotatable means for turning said rotatable means at a rotational speed having a controlled predetermined relationship to the corresponding connected motor's rotational speed, each said motor including a torque producing drive field and a rotor field, a pair of electrical drive field producing means each determining the current frequency which separately synchronously determines substantially exactly the rotational speed of its corresponding said motors, electrical power producing means for the rotor field of each of said motors, and speed controlling means which performs the functions of separately and directly fixing the frequency of each said drive field producing means whereby said transportation means is propelled at a predetermined



speed and steered in response to the separately governed rotational speeds of each of said motors.

3,970,161
MOTOR VEHICLE

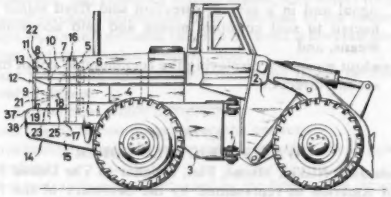
Wilhelm Rowe, Willich, and Jost Gerresheim, Dusseldorf, both of Germany, assignors to International Harvester Company, Chicago, Ill.

Filed July 24, 1975, Ser. No. 598,606

Claims priority, application Germany, July 31, 1974, 2436953

Int. Cl.² B60K *11/04*

U.S. Cl. 180—54 A **5 Claims**



1. In a motor vehicle having a grill frame with top and lower sections, an engine, a radiator for cooling the engine and an engine-driven fan for blowing air through the radiator and out of said grill frame; the improvement comprising:

an air circulation box, having an upper portion and a protruding lower portion including upper faces thereon, connected air tight to said grill frame;

said upper portion defining with said grill frame a substantially vertical passageway;

said protruding lower portion forming a substantially horizontal passageway extending across the width of the vehicle and along the sides thereof essentially parallel to the longitudinal axis of the vehicle;

said horizontal passageway communicating with said vertical passageway adjacent said grill frame; and

at least one outlet opening formed in the upper faces of said protruding lower portion.

3,970,162

DEVICE FOR SUSPENDING THE BODY AND THE ENGINE-DRIVE UNIT IN AN AUTOMOBILE VEHICLE

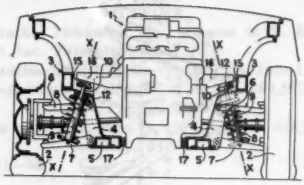
Robert Le Salver, Chanteloup les Vignes, and Dominique Poupard, Courbevoie, both of France, assignors to Automobiles Peugeot, Paris and Regie Nationale des Usines Renault, Boulogne-Billancourt, both of, France

Filed Mar. 14, 1975, Ser. No. 558,358

Claims priority, application France, Mar. 28, 1974, 74.10934

Int. Cl.[2] B60G *13/00*; B60K *5/00*

U.S. Cl. 180—64 R 9 Claims



1. An elastically yieldable suspension device comprising a body of an automobile vehicle, a unit comprising an engine-drive assembly or engine of the automobile vehicle, a wheel assembly of the vehicle, a suspension member connecting the wheel assembly to the body, a damper having a lower part bearing against the suspension member and an upper part, the upper part and lower part being relatively movable in operation of the damper, a first elastically yieldable block elastically connecting said upper part to the body, and a second elastically yieldable block elastically connecting the upper part of the damper to said unit to support said unit.

3,970,163

AUTOMOTIVE VEHICLE DRIVE

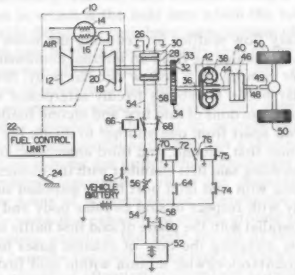
Keijiro Kinoshita, Yokohama, Japan, assignor to Nissan Motor Co., Ltd., Japan

Filed Oct. 15, 1974, Ser. No. 514,916

Claims priority, application Japan, Oct. 23, 1973, 48-119118

Int. Cl.[2] B60K *9/00*

U.S. Cl. 180—65 A 5 Claims



1. An automotive vehicle drive, comprising: a single shaft gas turbine engine having an output turbine shaft; a hydraulic torque converter driven by the output turbine shaft and including a forward-reverse gearbox; a motor-generator having an armature connected to the turbine shaft to rotate therewith and an electric field surrounding the armature; a battery; an accelerator switch which is closed as long as an accelerator pedal is depressed; an engine speed switch which is closed when the engine speed is higher than a predetermined level; a brake switch which is closed when a brake pedal is depressed; a first relay switch having a first pair of normally open contacts and a second pair of normally closed contacts, the first pair of normally open contacts of said first relay switch being connected in series with said electric field and said battery, the second pair of normally closed contacts of said first relay switch being connected in series with said electric field and said battery and in parallel with the first pair of normally open contacts; a first solenoid coactive with said first relay switch and connected in series with the accelerator switch, said first solenoid when energized urging said first relay switch to close the first pair of normally open contacts thereof and to open the second pair of normally closed contacts thereof; a second relay switch having a first pair of normally closed contacts and a second pair of normally closed contacts, the first pair of normally closed contacts of said second relay switch and the second pair of normally closed contacts of said second relay switch being connected with the first pair of normally open contacts of said first relay switch and the second pair of normally closed contacts of said first relay switch, respectively; a second solenoid coactive with said second relay switch and connected in series with said engine speed switch, said second solenoid when energized urging said second relay switch to open the first pair of normally closed contacts thereof and the second pair of normally closed contacts thereof; a sixth switch having a pair of normally open contacts connected in parallel with the second pair of normally closed contacts of said second relay switch; a third solenoid connected in series with said brake switch, said third solenoid when energized urging said sixth switch to close the pair of normally open contacts thereof; and a variable resistor connected with the first pair of normally closed contacts of said second relay switch.

3,970,164

SMALL-SIZED SNOWMOBILE

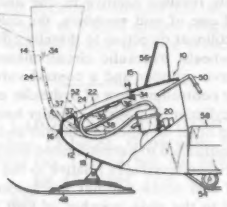
Keisuke Suzuki, Hamamatsu, Japan, assignor to Yamaha Hatsudoki Kabushiki Kaisha, Iwata, Japan

Filed Dec. 17, 1974, Ser. No. 533,527

Claims priority, application Japan, Dec. 17, 1973, 48-144931[U]

Int. Cl.[2] B60K *11/04*; B62D *25/12*

U.S. Cl. 180—68 R 6 Claims



1. A small-sized snowmobile comprising a body, a water-cooled engine disposed within the forward end portion of the body, a cowl made of synthetic resin and including a wide upper portion inclined toward the forward end of the snowmobile to define, together with the body, an engine compartment, said wide upper portion of said cowl having an opening and a mounting portion at the marginal edge portion of the opening, and a radiator disposed in a manner to incline toward the forward end of the snowmobile and to permit the radiator to be directly exposed to the atmosphere through said opening and supported by the mounting portion, the front end of said cowl being swingably mounted on the body by means of a hinge, whereby said cowl and said radiator may be disposed to expose or cover said engine compartment.

3,970,165

POWER ASSISTED STEERING SYSTEM

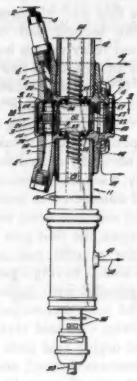
Per Ulf Andersson, Lidkoping, Sweden, assignor to Aktiebolaget Svenska Kullagerfabriken, Goteborg, Sweden

Filed Nov. 4, 1974, Ser. No. 520,655

Claims priority, application Netherlands, Nov. 2, 1973, 73.15091

Int. Cl.[2] B62D 5/08

U.S. Cl. 180—155 13 Claims



1. A power assisted steering system for a vehicle including a steering wheel operatively connected to steered wheels comprising a housing, a nut-and-screw mechanism mounted in said housing and comprising a nut member and a screw member, an input shaft mounted in said housing, at least one shaft connected at one end to the steering wheel and at its opposite end to said input shaft, intermeshing gear means carried by said input shaft and one of said members of said nut-and-screw mechanism, means operatively connecting the other member of said nut-and-screw mechanism to the steerable wheels, the members of said nut-and-screw mechanism being of a configuration to preclude rotation relative to one another whereby upon rotation of one of said members, the other member is actuated in a rectilinear direction to thereby effect movement of the steered wheels, hydraulic circuit means including a double-acting servo-cylinder and a control valve including a slide member for controlling flow of hydraulic medium to and from said servo-cylinder, said servo-cylinder being operatively connected to said other member of said nut-and-screw assembly, an element journalled to permit limited movement thereof in said housing circumferentially relative to the axis of one of the members of said screw-and-nut mechanism and operatively connected to the slide member of said control valve, said input shaft journalled in said element, said slide member normally disposed in a neutral position closing flow of pressure medium to said servo-cylinder, rotation of said shaft in one direction effecting rotation of said input shaft relative to said one member and circumferential displacement of said element from said neutral position to permit flow of pressure medium to said servo-cylinder.

3,970,166

AXLE MOUNTING OF INTEGRAL POWER STEERING GEAR

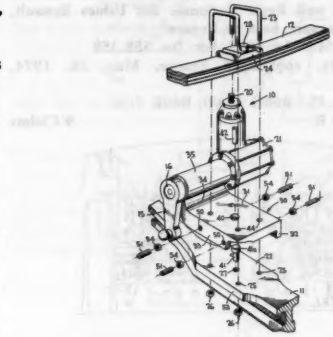
Richard H. Sheppard, c/o R. H. Sheppard Co., Inc., Hanover, Pa. 17331

Filed Jan. 23, 1975, Ser. No. 543,631

Int. Cl.[2] B62D 5/06

U.S. Cl. 180—163 14 Claims

1. A bracket assembly for axle mounting of a power steering gear unit on a vehicle axle comprising



a base plate, means connecting said plate to said unit, tight fitting pin means locating the base plate on said axle, clamp means for holding said plate to said axle, and positive locking means extending between said plate and said axle for positively resisting the lateral shifting and rotational reaction forces of said unit during operation.

3,970,167

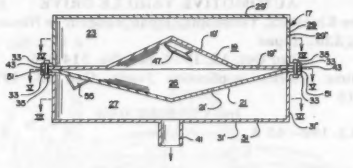
ROTARY FLOW MUFFLER

Joseph C. Irvin, 756 Ivy Road, Memphis, Tenn. 38117

Filed May 12, 1975, Ser. No. 576,635

Int. Cl.[2] F01N 1/08, 1/12

U.S. Cl. 181—58 11 Claims



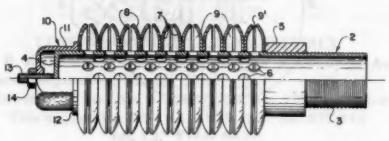
1. A rotary flow muffler for reducing the noise caused by exhaust gases emanating from an internal combustion engine, said muffler comprising a hollow circular body; first and second circular baffle memberrs fixedly interposed within said circular body, portions of said first and second baffle members being spaced apart from one another to divide the interior of said body into first, second, and third chambers; an inlet port commmunicating said first chamber with the exhaust structure of the engine with said inlet port being disposed substantially tangentially with respect to said circular body and being substantially parallel with the plane of said first baffle member for controllably directing the flow of exhaust gases to provide a spiraling counterclockwise motion within said first chamber, said first baffle member being provided with a plurality of centrally disposed ports for communicating said first and second chambers one with the other, said first baffle member including a plurality of central vortical vane means respectively being juxtapositioned relative to said plurality of centrally disposed ports for controllably redirecting the flow of the exhaust gases as they pass from said first chamber into said second chamber to provide an outward spiraling clockwise motion of the exhaust gases within said second chamber, said second baffle member being provided with a plurality of peripherally disposed ports for communicating said second and third chambers one with the other, said second baffle member

including a plurality of peripheral vortical vane means respectively being juxtapositioned relative to said plurality of peripherally disposed ports for controllably redirecting the flow of the exhaust gases as they pass from said second chamber into said third chamber to provide a spiraling counterclockwise motion within said third chamber, and an outlet port concentrically disposed on said body for communicating said third chamber from without whereby the exhaust gases ultimately exit from said muffler.

3,970,168
MUFFLER

John R. Mucka, Pittsburgh, Pa., assignor to H. K. Porter Company, Inc., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 365,956, June 1, 1973, abandoned, which is a division of Ser. No. 484,587, July 1, 1974, Pat. No. 3,880,252
This application June 13, 1974, Ser. No. 478,909
Int. Cl.² F01N *1/10*
U.S. Cl. 181—60 **4 Claims**



1. A muffler for reducing exhaust gas noise generated by internal combustion engines, air-driven tools and machines and the like comprising:

a. a straight tubular body of uniform diameter having means at one end for connecting it to the exhaust of an internal combustion or air-driven motor and having a closure at its other end, a length of the tubular body intermediate its ends having perforations therein extending lengthwise and circumferentially of the tubular body,

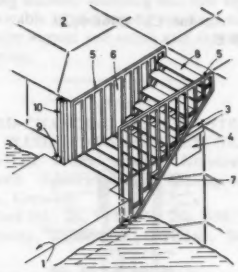
b. a series of generally substantially concavo-convex annuli all of the same diameter each having a central opening therethrough slidably fitted over the perforated lenght of the body, said annuli being arranged in several pairs in which the concave surfaces of the annuli of each pair are in confronting relation, each annulus having a flat central portion in which is the hole into which the tubular body is slidably fitted, the peripheral edge portion of the annuli of each pair being turned inwardly toward the peripheral edge portion of the other annulus of the pair, at least one annulus of each pair having spaced projections thereabout arranged to engage the confronting edge portion of the other annulus of the pair to provide between said confronting edge portions of each pair a circumferentially extending exhaust gas outlet which discharges directly to the ambient atmosphere, all of the projections in the muffler being of uniform height whereby the circumferentially extending exhaust gas outlets around each pair of confronting annuli is the same for all of the pairs, the spaces between the confronting faces of each such pair of annuli providing attenuation chambers around the tubular core into which the perforations in the tubular core discharge exhaust gases, the shape of said chambers being defined by the concave shapes of the confronting walls of the annuli, the circumferentially-extending exhaust gas outlet of each chamber having an area open directly to the atmosphere at least as great as te combined area of all of the perforations that open from the tubular body into each such chamber to avoid the build-up of back pressure in said attenuation chambers, the flat central areas of each annulus making face-to-face contact with the flat areas of the adjacent annulus whereby the annuli support one another against becoming tilted and thereby assure that the confronting edges of each pair of annuli are parallel around the periphery of each attenuation chamber; and

c. an abutment on the tubular body at each end of said series of annuli serving to confine the series of annuli on the tubular body over the perforated length of said body.

3,970,169
GANGWAY LADDER

Bernabe Hernandez Gonzalez, Calle Villalba Hervas 12°, Santa Cruze de Tenerife (Canarias), Spain

Filed Nov. 7, 1975, Ser. No. 630,063
Claims priority, application Spain, Mar. 8, 1975, 210608
Int. Cl.² B65G *11/00*; E06C *9/06*
U.S. Cl. 182—1 **4 Claims**



1. A gangway-ladder, for connecting a floating mooring platform to a dockside wall, comprising:

i. a guide structure secured to the dockside wall and defining a plurality of parallel vertical guide channels disposed in a row extending outwardly from the dockside wall, the base of each successive chanel considered in the direction away from the dockside wall being lower than the base of the preceding channel,

ii. a plurality of parallel steps disposed one in each of said guide channels,

iii. lifting beam means secured to the floating mooring platform and positioned to extend beneath the steps, and

iv. coupling means connecting the floating mooring platform and the dockside wall such that the floating mooring platform is held at a fixed spaced relationship from said dockside wall but is able to move vertically with respect thereto.

3,970,170
LADDER BRIDGING DEVICE

Robert D. Darling, 13 Jay St., Gloversville, N.Y. 12078

Filed Oct. 1, 1974, Ser. No. 510,992
Int. Cl.² E06C *7/50, 5/32*
U.S. Cl. 182—230 **1 Claim**

1. A ladder bridging device having an elongated U-shaped structure, said structure having first and second side walls interconnected by a central web connecting wall, said first side wall having an end portion inclined at an angle thereto,

wherein said second side wall has recesses formed therein to co-operate in supporting relationship with the rungs of a ladder structure, wherein said first and second side walls are of unequal length and are tapered longitudinally, and wherein said first side wall is longer than said second side wall.

3,970,171

THREE-STAGE LOAD-LIFTING ASSEMBLY FOR FORK-LIFT TRUCKS

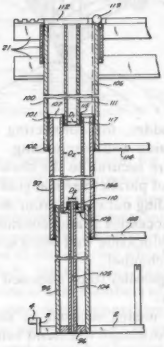
Gunter Honecker, Klein Welzheim, and Kurt Knappe, Sulzbach, both of Germany, assignors to Linde Aktiengesellschaft, Hollriegelskreuth, Germany

Filed June 26, 1975, Ser. No. 590,577

Claims priority, application Germany, June 26, 1974, 2430789

Int. Cl.² B66F 9/20

U.S. Cl. 187—9 E 10 Claims



1. A load-lifting assembly comprising:

a support;

an upright inner tube fixed on said support;

an intermediate tube vertically telescopingly slidable on said inner tube and guided thereon;

an outer tube vertically telescopingly slidable on said intermediate tube and guided thereon;

a load-engaging carriage vertically slidable along and guided on said outer tube;

a flexible elongated element connected to said carriage for controlling the displacement thereof;

a three-stage extensible hydraulic ram in addition to said tubes and having a first member secured to said inner tube, a second member riding on said first member and secured to said intermediate tube, and a third member riding on said second member and secured to said outer tube; and

means for pressurizing said three-stage ram to telescope said members for displacing said tubes and carriage from a down position with said carriage lowered and said outer tube completely surrounding said intermediate tube and said inner tube, an upper position with said carriage lifted and said tubes telescoped upwardly.

3,970,172

CLOSED-LOOP TYPE DISC BRAKE

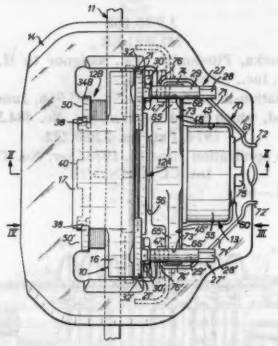
Gérard De Gennes, Senlis, France, assignor to Societe Anonyme Francaise du Ferodo, Paris, France

Filed Nov. 15, 1974, Ser. No. 524,342

Claims priority, application France, Nov. 16, 1973, 73.40831; Oct. 29, 1974, 74.36059

Int. Cl.² F16D 65/02

U.S. Cl. 188—73.4 37 Claims



1. A disc brake comprising a fixed support, a disc adapted to be mounted for rotation on a shaft to be braked, a brake shoe disposed on each side of said disc and movable perpendicularly to the plane of said disc, a hydraulic operating unit disposed on one side of said disc and including a blind cylinder member and a piston slidably mounted in said cylinder member, said piston acting directly on one of said brake shoes adjacent thereto, a generally ring-like transfer member extending chordally of said disc and generally around said disc and said brake shoes and said hydraulic operating unit for acting on said other brake shoe in response to said cylinder member, resilient means secured to said fixed support and urging said transfer member radially outwardly relative to said disc, retention means for limiting the radial movement of said transfer member including two retaining and guiding pin means removably mounted on said fixed support and extending to said one side of said disc, both said pin means being substantially parallel to the axis of said disc, said cylinder member having at least one flat guiding surface thereon opposite each said pin means and in sliding line contact with said pin means.

3,970,173

DEVICE IN A FLUID PRESSURE ACTUATED BRAKE UNIT FOR ENABLING THE OUTGOING PUSH ROD TO BE BROUGHT BACK FROM THE OUTSIDE

Nils Borje Lennart Sander, Malmo, Sweden, assignor to Svenska Aktiebolaget Bromsregulator, Malmo, Sweden

Filed June 11, 1975, Ser. No. 585,813

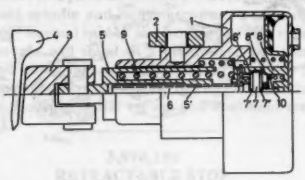
Claims priority, application Sweden, June 24, 1974, 7408249

Int. Cl.² F16D 65/56

U.S. Cl. 188—203 1 Claim

1. In an automatic adjuster unit having a single acting slack adjuster and movable piston fluid brake unit coupled to move a push rod toward a braking position, means for enabling the push rod to be returned against the single action of said adjuster, comprising in combination, an axially disposed rotatable element, a non-rotatable element, threads between said two elements in non-self-locking engagement permitting the rotatable element to rotate, a clutch having two clutch surfaces positioned on said rotatable element to engage mating clutch surfaces in opposite axial positions of said rotatable

element, the said mating clutch surfaces disposed for movement with said piston, a spring biased to hold one axial pair of clutch surfaces engaged by the push rod in the brake applying direction so that the clutch surfaces can become disengaged



when the push rod is returned by a pressure exceeding the spring force, and an axially movable member placed along said push rod to engage the clutch at the fully retracted piston position and hold the clutch surfaces axially in a position with both clutch surfaces disengaged.

3,970,174

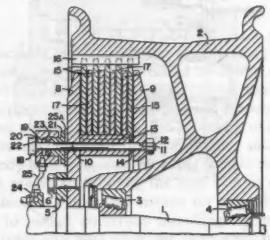
LOW WEAR DISK BRAKE ASSEMBLY

Fred P. Kirkhart, Atwater, Ohio, assignor to Goodyear Aerospace Corporation, Akron, Ohio

Continuation of Ser. No. 433,860, Jan. 16, 1974, abandoned. This application May 15, 1975, Ser. No. 577,914

Int. Cl.² F16D *69/02*

U.S. Cl. 188—251 A **10 Claims**



1. A low wear disk brake comprising:

a disk characterized by being made from a carbon base material,

a flexural strength of greater than 5,000 psi,

said disk having a density greater than 1.40 grams per cc, and impact strength greater than 5 inch pounds per inch, an amount of carbon or graphite of at least about 75 percent of the total disk volume, and

an average interlaminar spacing of crystalline and amorphous carbon of not more than 3.39 angstrom units at 15°C.

3,970,175

SUPPORT FOR AN ACTUATING ARM OF A CONTROL ELEMENT OF A SPRING CLUTCH

Donald J. Baxter, South Euclid, Ohio, assignor to Marquette Metal Products Company, Cleveland, Ohio

Filed Sept. 2, 1975, Ser. No. 609,689

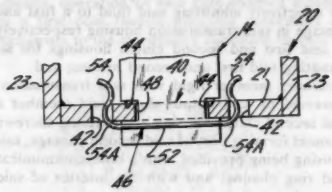
Int. Cl.² F16D *11/02*

U.S. Cl. 192—22 **7 Claims**

1. In combination with an actuating arm movable into and out of engagement with a control spring element of a spring clutch mechanism, a support means for said actuating arm which comprises:

a. a frame having a first opening second openings adjacent to and on opposite sides of said first opening;

b. said actuating arm being slidably receivable in said first opening in the frame; and



c. a retaining member spanning said first opening and slidably receivable in said second openings to grip the frame and thereby engage and retain said actuating arm in said first opening.

3,970,176

SPEED-CHANGING SYSTEM WITH TWO FLUID-ACTUATED CLUTCHES

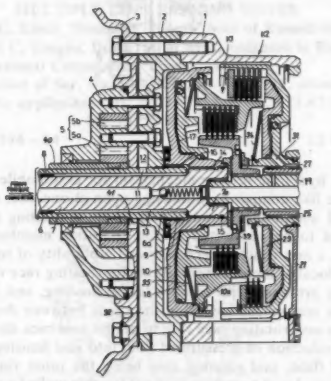
Manfred Bucksch, Friedrichshafen, Germany, assignor to Zahnradfabrik Friedrichshafen Aktiengesellschaft, Friedrichshafen, Germany

Filed Dec. 23, 1974, Ser. No. 535,701

Claims priority, application Germany, Dec. 24, 1973, 2364540

Int. Cl.² F16D *25/10*

U.S. Cl. 192—87.11 **8 Claims**



1. A speed-changing system comprising:

an engine-driven input shaft;

an inner output shaft and a surrounding outer output shaft coaxial with said input shaft;

planetary-gear means connecting said output shafts to a load;

a transmission housing surrounding parts of said input and output shafts;

a first clutch in said transmission housing including a first clutch housing positively connected with an extremity of said input shaft, first coacting annular friction elements in said clutch housing and on an extremity of said inner output shaft, and a first piston in said first clutch housing actuatable for making said first friction elements effective to couple said input shaft with said inner output shaft;

a second clutch in said transmission housing including a second clutch housing positively connected with an extremity of said outer output shaft, second coacting annular friction element on said first clutch housing and in said second clutch housing, and a second piston in said second

clutch housing actuatable for making said second friction elements effective to couple said input shaft with said outer output shaft;

a source of high-pressure fluid provided with valve means for selectively admitting said fluid to a first and second passage in said transmission housing respectively leading to said first and second clutch housings for selectively actuating said first and second pistons; and

a stationary member rigid with said transmission housing traversed by said output shafts, said member adjoining said second clutch housing and defining therewith a ring channel forming part of said second passage, said second housing being provided with a bore communicating with said ring channel and with the interior of said second clutch housing.

3,970,177

HYDRAULIC RELEASE MECHANISM FOR CLUTCHES

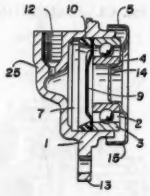
Roy Peter Garrett, Gothenburg, Sweden, and Derek Ray Parkins, Barton, England, assignors to SKF Trading and Development Co. B.V., Amsterdam, Netherlands

Continuation-in-part of Ser. No. 349,456, April 9, 1973, abandoned. This application Nov. 26, 1974, Ser. No. 527,357

Claims priority, application United Kingdom, Apr. 13, 1971, 9244/71; Sept. 3, 1971, 41245/71; Germany, Apr. 13, 1972, 2217942

Int. Cl.² F16D *25/08*

U.S. Cl. 192—91 A **9 Claims**



1. A hydraulic release mechanism for automobile clutches and the like comprising a housing open at one end, a bearing located within said housing comprising a rotating race ring adapted to be connected to the operating member of said clutch, a non-rotating race ring and a plurality of rolling elements located therebetween, said non-rotating race ring being slidably arranged with respect to the housing, and including slidable seal means enclosing the space between the housing and the non-rotating race ring to permit said race ring to slide on introduction of pressurized fluid into said housing without loss of fluid, said rotating ring being the inner ring of said bearing and said operating element is a thin walled cup-shaped member secured to the inner race ring and covering the open end of the bearing and the release mechanism.

3,970,178

CHAIN SAW CLUTCH WITH ENGAGING AND RELEASING CENTRIFUGAL WEIGHTS

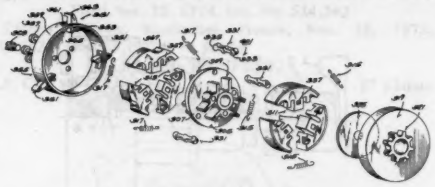
Ulrich O. Densow, Peterborough, Canada, assignor to Outboard Marine Corporation, Waukegan, Ill.

Filed Sept. 4, 1973, Ser. No. 393,758

Int. Cl.² F16D *43/14*; B27B *17/00*

U.S. Cl. 192—105 BA **24 Claims**

1. A chain saw comprising a frame, an engine mounted on said frame, a drive shaft rotatably mounted on said frame and driven by said engine, a clutch driven by said drive shaft and including a rotatable clutch drum, a clutch shoe movable relative to a position of driving engagement with said clutch drum in response to clutch shoe rotation, and selectively operable counter weight means connected to said clutch shoe for preventing engagement of said clutch shoe with said clutch drum, a bar mounted on said frame for movement bebtween a first position and a second position spaced from said first position, and means operably connected to said bar and to



said counter weight means for operating said counter weight means to prevent clutch shoe engagement when said bar is in said first position and to permit clutch shoe engagement when said bar is in said second position.

3,970,179

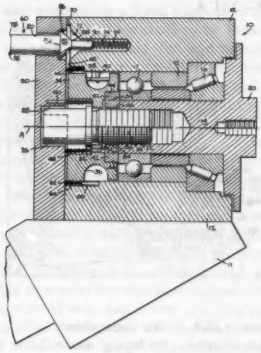
DIE HOLDER

Jerome Friedman, 39-39 29th St., Long Island City, N.Y. 11101

Filed June 10, 1975, Ser. No. 585,463

Int. Cl.² F16D *71/100*

U.S. Cl. 192—138 **12 Claims**



1. A die holder comprising: a housing; a spindle supported for rotation in and relative to said housing, said spindle terminating in a free end portion capable of supporting a die; position-referencing means operatively associated with said housing and spindle for governing an at-rest position of said spindle, said position-referencing means including respective abutment means operatively associated with said spindle and housing for limiting rotation of said spindle to less than 360° and resilient means for urging said spindle to a rotary position at which the respective abutment means of said spindle and housing are pressed against one another; collar means for carrying the respective abutment means of said spindle in a path and at a position engageable with the respective abutment means of said housing, said collar means including an inner annular flange, said spindle including annular flange means disposed axially beyond said inner annular flange at an end portion of said spindle opposite said free end portion of said spindle, said annular flange means pressing axially against said inner annular flange to prevent axial separation of said collar means from said spindle and frictionally resist turning of said spindle relative to said collar means; and shearable means for fixedly securing said collar means radially to said

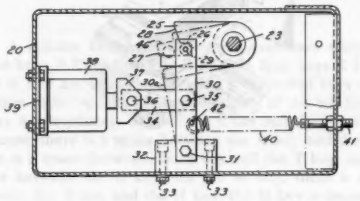
spindle to prevent the latter from turning relative to said collar means, said shearable means having a shear-resistance less than the bending and fracture-resistance of said spindle, housing, collar means and abutment means; whereby, upon the application of an excessive torque to said spindle tending to rotate the latter to a position at which the respective abutment means of said spindle and housing contact one another substantially 360° beyond said at-rest position of said spindle, said shearable means will shear at a circumferential parting line between said collar means and spindle to rotatably free said spindle from said collar means and thereby obviate damage to said spindle, housing, collar means and abutment means.

3,970,180

RETRACTABLE STOP

Herman Schlottmann, 2299 Rush Lake Road, Pinckney, Mich. 48169, and John G. Melchior, 2200 Scottwood No. 310, Toledo, Ohio 43620

Filed Oct. 22, 1974, Ser. No. 516,975
Int. Cl.² B65G *13/00*
U.S. Cl. 193—35 A **4 Claims**



1. A retractable stop mechanism for arresting article travel along a roller conveyor characterized by a stop arm pivotally mounted between adjacent rollers to extend above and below the upper support surface of the rollers in respective blocking and retracted passing positions, the geometry of said stop arm mounting causing forward article travel along said conveyor to move said stop arm from said blocking to said retracted position, a latch means for holding the stop arm in said blocking position, selectively operable means for releasing said latch mechanism to permit an article travelling on the roller conveyor to retract and pass over the stop arm, means for restoring said stop arm and latch means to said blocking position, and article weight responsive means for rendering said last means inoperative during the overpassing of any article begun prior to said restoration; said retractable stop mechanism including a cross shaft with pivotally mounted ends having said stop arm rigidly mounted thereon, said latch means comprising a latch plate secured to said cross shaft with means for engaging said latch plate to prevent its pivotal movement when said stop arm is in blocking position including a recess in said latch plate spaced from the shaft pivotal axis, a roller for engaging said recess in a direction opposing pivotal movement of said latch plate and cross shaft, and a retractable reactive mounting for said roller movable between operative blocking and inoperative nonblocking positions in response to said selectively operable means.

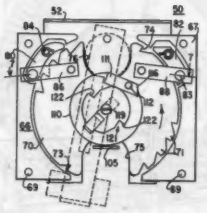
3,970,181

TWO-COIN-OPERATED DISPENSING MECHANISM

Alfred M. Rubio, Chicago, Ill., assignor to National Sanitary Laboratories, Inc., Chiago, Ill.

Filed Aug. 11, 1975, Ser. No. 603,516
Int. Cl.² G07F *5/04*
U.S. Cl. 194—63 **15 Claims**

1. Coin controlled apparatus comprising coin-enabled means operative upon receipt of a coin therein for undergoing a predetermined movement, actuating means movable for actuating an associated device, and clutch mechanism coupled to said coin-enabled means and movable between an engaged condition coupling said actuating means to said coin-enabled means for movement therewith and a disengaged condition decoupling said actuating means from said coin-enabled means, operation of said coin-enabled means upon receipt of a first coin therein effecting movement of said clutch mechanism to the disengaged condition thereof so that



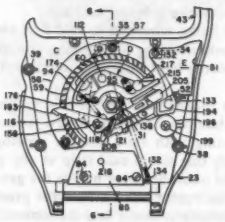
said actuating means is not moved with said coin-enabled means, further operation of said coin-enabled means upon receipt of a second coin therein effecting movement of said clutch mechanism to the engaged condition thereof for moving said actuating means with said coin-enabled means to perform said predetermined function, whereby said predetermined function is performed only after two coins are received in said apparatus.

3,970,182

MULTIPLE COIN PARKING METER

William C. Kiehl; Thomas F. Moore, both of Russellville, and Jimmie C. Teague, Dover, all of Ark., assignors to Rockwell International Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 540,129, Jan. 10, 1975, abandoned.
This application Oct. 22, 1975, Ser. No. 624,673
Int. Cl.² G07F *5/00*
U.S. Cl. 194—84 **12 Claims**



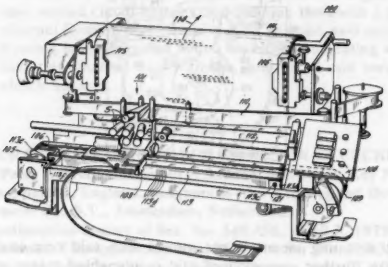
1. In a time setting mechanism for setting time in accordance with the denomination of coin inserted therein, a housing, a coin opening in said housing for inserting a coin into said mechanism, coin carrying means having a receptacle for receiving a coin inserted into said meter mechanism and movable from an initial postion for receiving a coin into said receptacle through a time setting cycle, a plurality of parallel timesetting cam surfaces associated with said coin carrier extending adjacent to the path of movement of a coin in said coin carrier, at least two of said cam surfaces being displaced from each other in a direction perpendicular to the direction of movement of said coin carrying means, additional unitary fixed cam means within said housing responsive to the size of said coin to align said coin with a selected one of said time setting cam surfaces.

3,970,183

RANDOM ACCESS LINE PRINTER

Prentice Robinson, Pelham, and Paul S. Ramsden, Jr., Hudson, both of N.H., assignors to Centronics Data Computer Corporation, Hudson, N.H.

Filed June 5, 1974, Ser. No. 476,581
Int. Cl.² B41J 3/04
U.S. Cl. 197—1 R 27 Claims



1. Registration apparatus for use with line printers having means for supporting and feeding a paper document;

print head means for printing characters on said document;

a carriage supporting said print head in close proximity to said document supporting means and means for moving said carriage relative to said document to effect printing of a line;

said registration apparatus comprising:

an elongated stationary registration strip positioned in spaced substantially parallel fashion relative to said supporting means, said strip having a plurality of uniformly spaced slits each separated from adjacent slits by opaque bars, said slits being adapted to pass light therethrough;

housing means mounted on said carriage and movable therewith;

said housing means having a slot for receiving said strip;

first and second chambers being provided in said housing means on opposite sides of said slot;

a light source being mounted in said first chamber;

said first chamber having an opening communicating with said slot to cause light from said source to impinge on said strip;

photodetector means mounted in said second chamber;

said second chamber having a narrow rectangular opening communicating with said slot for passing light passing through only one slit in said strip at any given instant to activate said photodetector means for generating a pulse to actuate said print head means for printing characters at precise locations along said document;

said paper document is being adapted to have a maximum number n of characters printed on each line;

said strip having $n/2$ slits;

said photodetector means being adapted to generate a pulse as said rectangular opening passes each slit whereby the leading edge of said pulse occurs as said opening passes one edge of a slit and wherein the trailing edge of the pulse occurs as the rectangular opening passes the opposite edge of the slit;

circuit means coupled to said photodetector means for generating a first narrow pulse responsive to the leading edge of the pulse generated by said photodetector means and for generating a second narrow pulse responsive to the trailing edge of the pulse generated by said photodetector means, said first and second narrow pulses being of substantially equal pulse width and being of a pulse width which is substantially narrower than the pulse width of the pulse generated by said photodetector means;

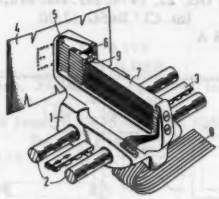
the output of said circuit means being coupled to said print head means to enable the print head means twice for each slit passed by said rectangular opening.

3,970,184

MOSAIC PRINTING HEAD FOR TYPEWRITERS OR SIMILAR MACHINES

Hans Helmrich, Geisenbrunn, and Max Guntersdorfer, Zorneding, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Aug. 1, 1974, Ser. No. 493,555
Claims priority, application Germany, Aug. 20, 1973, 2342021
Int. Cl.² B41J 3/10
U.S. Cl. 197—1 R 4 Claims



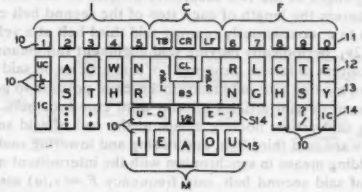
1. A mosaic printing head for typewriters, data printers, teleprinters and the like utilizing dot-producing, pin-like elements for recording characters in the form of elements of a dot pattern upon a data carrier, comprising a plurality of like dot-producing printing elements disposed in adjacent parallel relation in a straight row extending transversely to the line of printing involved, and defining the maximum height of the characters to be formed with at least some of the characters comprising selected dots of a plurality of successively formed rows of dots produced by said elements, like piezoelectric transducers for the respective printing elements, each transducer comprising an elongated, flat, relatively thin piezoelectric member having opposite sides of relatively large area, and relatively small edge and end areas, the opposite sides of each member carrying respective electrode layers for applying electric fields to the member for effecting elongation and contraction thereof, said transducer members being disposed in stacked substantially parallel relation with corresponding ends and edges disposed substantially in respective common planes, and the electrode layers of adjacent members disposed in opposed relation, the respective transducer members having a thickness such that each of the latter are disposed in longitudinal alignment with its cooperable printing element, each printing element having an operational travel greater than the elongation-contraction dimension of the cooperable transducer member in such operational direction, and being relatively freely movable in said operational direction with respect to and independently of the cooperable transducer member, with the end of the latter disposed to transmit driving forces to the cooperable printing element in response to predetermined movement of such transducer member, as the result of the application of a corresponding field to such electrodes, whereby such printing element is accelerated toward such a data carrier, and resilient means for urging each printing element in a direction toward its cooperable transducer member, said resilient means exerting forces upon the printing elements which are considerably lower than the driving forces acting thereon by the action of the cooperable transducer members as a result of changes in the electric fields to which they may be subjected.

3,970,185

SYLLABIC TYPEWRITER

Dothan L. Shelton, Amarillo, Tex., assignor to Syllographic Machines, Inc.

Filed Dec. 30, 1971, Ser. No. 213,863
Int. Cl.[2] B41J 3/26, 3/10
U.S. Cl. 197—9 16 Claims



1. A syllabic keyboard for writing machines wherein the initial keys A C W N S T H R and the final keys R L C T E N G H S Y are arranged as follows: the initial keys are in a position to be operated with the fingers of the left hand; the A key is immediately back of the S key and the two keys are adjacent; there is a space between the A key and the C key; there is a space between the S key and the T key; there is a space between the C key and the W key; there is a space between the T key and the H key; the H key is immediately forward of the W key and there is a space between the H key and the R key; there is a space between the W key and the N key; the R key is immediately forward of the N key; and the final keys are in the position to be operated with the right hand, the R key is immediately behind the N key and adjacent thereto; there is a space between the R key and the L key; there is a space between the N key and the G key; the G key is immediately forward and adjacent to the L key; there is a space between the L key and the C key; there is a space between the G key and the H key; and the C key is immediately behind and adjacent to the H key; there is a space between the C key and the T key; there is a space between the H key and the S key, and the S key is immediately forward of the T key adjacent thereto; there is a space between the T key and the E key; and there is a space between the S key and the Y key, and the Y key is immediately forward of the E key and adjacent thereto.

3,970,186

DAMPER FOR A COMPOSITE PRINT WHEEL

Gordon Sohl, Richardson; Svetislav Mitrovich, and Ernest L. Staples, both of Dallas, all of Tex., assignors to Xerox Corporation, Stamford, Conn.

Filed Sept. 25, 1974, Ser. No. 509,194
Int. Cl.[2] B41J 1/32
U.S. Cl. 197—54 7 Claims

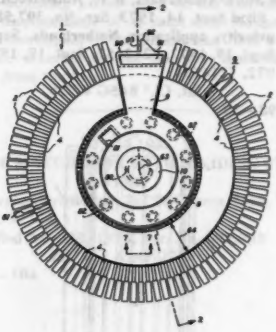
1. A print wheel for an impact printer comprising

an insert member having a plurality of beams extending radially outward from a generally circular center section in a substantially common plane with the beams being deflectible in a print direction generally normal to the common plane,

character slugs near the outer ends of the beams having impact surfaces engageable by hammer means to deflect the slug in the print direction enabling print surfaces on the slugs shaped in the form of characters to cooperate in a process for marking a record medium,

a first generally circular damper means adhesively coupled to one side of the beams, and

a second generally circular damper means adhesively coupled to the other side of the beams, said first and second



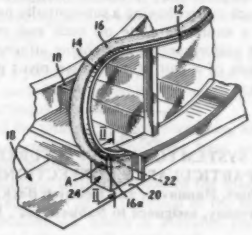
damper means being adhesively coupled to each other in the regions between the beams.

3,970,187

SAFETY DEVICE FOR PASSENGER CONVEYOR

Shigeru Esaki; Shigeru Murata; Matsuhiko Ishida, and Katsumi Kito, all of Inazawa, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Nov. 11, 1974, Ser. No. 522,891
Claims priority, application Japan, Nov. 12, 1973, 48-130606[U]; Nov. 19, 1973, 48-133996[U]
Int. Cl.[2] B66B 9/12
U.S. Cl. 198—16 R 4 Claims



1. In a passenger conveyor comprising a balustrade, a movable handrail traveling in use along the periphery of the balustrade and turned in its direction of travel at a conveyor departure landing, and a guide port for introducing the handrail into the mechanical portion of the passenger conveyor after it has been turned; a safety guard for the balustrade comprising: a barrier member disposed in front of said guide port and formed of a breakable material capable of easily being broken upon the application of a very low pressure by a conveyor passenger inadvertently applying pressure thereto and which produces a sound when breaking; and means defining an open groove on said barrier member, said groove having an opening narrower than the width of said movable handrail and having an inner portion dimensioned to receive said movable handrail, said movable handrail being disposed within the inner portion of said groove, and wherein said barrier member is formed of at least two barrier sections divided at a sectional plane extending lengthwise of the groove and intersecting the groove, said barrier sections being connected together in use into a unitary structure.

3,970,188

CARRIER ELEMENT FOR A HYDRASTATIC COOKER

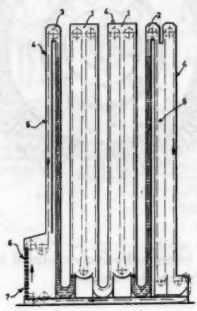
Johannes Jacobus Smorenburg, Abcoude, Netherlands, assignor to Stork-Amsterdam, B.V., Amstelveen, Netherlands

Filed Sept. 14, 1973, Ser. No. 397,588

Claims priority, application Netherlands, Sept. 19, 1972, 7212656; Sept. 19, 1972, 7212657; Sept. 19, 1972, 7212658; Oct. 26, 1972, 7214534

Int. Cl.² B65G 47/26

U.S. Cl. 198—30 11 Claims



1. A device for conveying containers along a looped path in the treatment space of a thermal treatment apparatus and traversing a charging and discharging station outside of the treatment space, comprising a pair of spaced endless chains each comprising a plurality of links pivotally interconnected by pivot pins having portions thereof protruding outwardly of their respective chains, a plurality of carrier elements to receive containers to be treated disposed at regular intervals between said chains, each carrier element comprising two parallel carriers positioned in mirror-symmetrical relation to each other, each carrier having a substantially polygonal cross section, and a mounting plate on each end of said carrier element, each said mounting plate being attached to the protruding portions of a pair of successive pivot pins on a said endless chain.

3,970,189

CONVEYOR SYSTEM FOR MANUFACTURED ARTICLES, PARTICULARLY CONFECTIONS

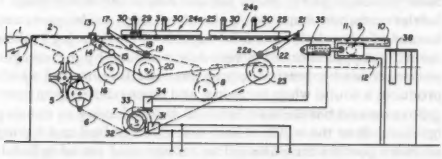
Gilbert Steinhart, Hannover, and Heinrich Bock, Ronnenberg, both of Germany, assignors to Nabisco, Inc., East Hanover, N.J.

Continuation-in-part of Ser. No. 308,428, Nov. 21, 1972, Pat. No. 3,854,569. This application Nov. 18, 1974, Ser. No. 524,624

Claims priority, application Germany, Feb. 9, 1972, 2206137

Int. Cl.² B65G 47/26

U.S. Cl. 198—34 5 Claims



1. In a method for operating a conveyor system of the type having a first conveyor belt movable at a velocity v_1 and adapted to transport irregularly spaced articles, wherein means for aligning said articles include a second conveyor belt positioned to receive directly said articles from said first belt, and a third belt positioned for receiving articles from said second belt, as well as alignment rail means positioned above said third belt, and article holding means positioned above said second belt to extend transversely to the direction of movement of said belts, the steps comprising intermittently operating said second belt at a stepping frequency $F = (v_1/a)$ in steps per minute and an average velocity v_2 v_1 with equal duration periods of running time and rest, whereby v_{2run} is at least equal to $2v_1$, wherein v_1 is the velocity of the first belt, wherein a is the minimum longitudinal spacing between the leading edges of the two successive articles on the first belt, and wherein the length of each step of the second belt corresponds to a, continuously running said third belt at a velocity v_3 $2v_1$, periodically moving said alignment rail means to a first position to inhibit movement of said articles on said third belt and moving said rail means to a second position to permit movement of said articles on said third conveyor belt, positioning said article holding means at the end of said second belt toward said third belt, and raising and lowering said article holding means in synchronism with the intermittent movement of said second belt, said frequency $F = (v_1/a)$ assuring that said alignment rail will be positioned between successive articles.

3,970,190

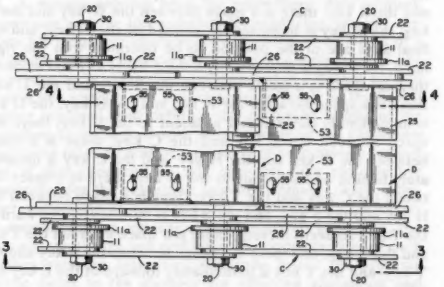
ROLLER CHAIN CONVEYOR BELT

Lawrence H. G. Kovats, Mentor, Ohio, assignor to Mayfran Incorporated, Mayfield Village, Ohio

Filed Nov. 4, 1974, Ser. No. 520,499

Int. Cl.² B65G 17/00

U.S. Cl. 198—189 1 Claim



1. A continuous roller chain type conveyor belt of the type to be supported on a pair of parallel extending supporting tracks, sprocket members at each end of each track, said belt including a pair of laterally spaced roller chains each comprised of a plurality of rollers and a row of chain links one on each side of said rollers and overlapping at the ends, roller shafts extending through said rollers and the overlapping ends of said chain links, a plurality of individual conveyor slats extending transversely between said roller chains; the improvement which comprises: a plurality of substantially flat slat links one affixed to each end of said slats and in continuous overlapping relationship at the ends, the vertical height of said slat links being substantially greater than the vertical height of said chain links in order to laterally retain material on said conveyor, said roller shafts extending through the overlapping portions of said slat links and holding same in pivoted relationship, the length between the pivot points of said chain and slat links being substantially equal so that longitudinal forces on said slats are transmitted through said slat links and said roller shafts.

3,970,191

TRANSFER APPARATUS

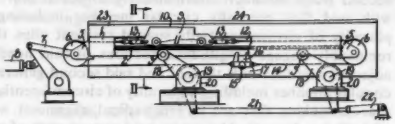
Derek Oldfield, Killamarsh, near Sheffield, and Dennis Postlethwaite, Rotherham, both of England, assignors to Wean United, Inc., Pittsburgh, Pa.

Filed Feb. 3, 1975, Ser. No. 546,662

Claims priority, application United Kingdom, Feb. 11, 1974, 6177/74

Int. Cl.² B65G 25/04

U.S. Cl. 198—219 6 Claims



1. Transfer apparatus comprising:

an elongate beam arranged substantially horizontal on supports which permit the beam to be displaced in the direction of its length,

means for displacing the beam in the direction of its length,

a carriage providing a support for a workpiece,

said carriage being supported on the beam so as to be displaceable therealong,

an elongate flexible member connected at its ends to opposite ends of the carriage with a reach of the flexible member extending substantially parallel to the length of the beam, and

anchor means fixed relative to the beam and connected to said flexible member at a position intermediate the ends of said member, the apparatus being so constructed and arranged that displacement of the beam relative to the anchor means causes the carriage to be displaced along the beam in addition to its movement with the beam.

3,970,192

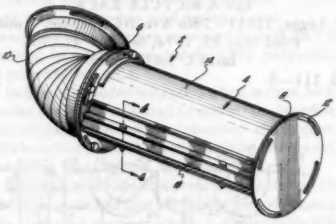
NOZZLE APPARATUS FOR A CONVEYOR BELT SYSTEM

Carl von Wolffradt, San Marino, Calif., assignor to Carl von Wolffradt, San Marino, Calif.

Filed Sept. 16, 1974, Ser. No. 506,396

Int. Cl.² B65G 45/00

U.S. Cl. 198—230 11 Claims



1. In a conveyor belt system having a continuous movable web member and means for moving the web member, the improvement including apparatus for removing material such as debris from the belt comprising:

a source of pressurized fluid;

a plenum member connected to the source of pressurized fluid having an elongated opening;

at least one first nozzle member, including a pair of relatively movable elongated blades capable of forming between the blades an elongated slot orifice extending adjacent and substantially across the width of the web member;

means on either side of the plenum member elongated opening for pivotally attaching a respective elongated blade, and

means for adjusting a flow area of the slot orifice by a pivoted displacement of at least one elongated blade whereby the impact of the pressurized fluid directed by the nozzle member against the web member removes material from the belt.

3,970,193

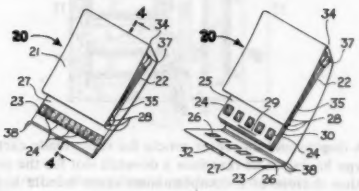
LATCHABLE MATCHBOOK WITH DIVIDING STRIKING STRIP

Donald Ragnvald Christensen, 21790 Ybarra Road, Woodland Hills, Calif. 91364

Filed Aug. 29, 1975, Ser. No. 609,085

Int. Cl.² A24F 27/00

U.S. Cl. 206—104 4 Claims



1. In a matchbook containing detachable matches which require generation of friction between the head of each match and a slightly abrasive chemical coating in order to cause their ignition and burning, as a new feature of invention, improvements comprising:

an effective surface area for match-striking purposes produced by a plurality of appropriately placed, shaped and surfaced parts being joined in a common plane only when said matchbook is closed;

a division of the total such assemblage being an integral part of, or mounted on, a supporting base portion of the matchbook contents;

a complementary, mating division of the total such assemblage being a part of that portion of the sheetlike cover of said matchbook which is movable for purposes of opening and closing said matchbook.

4. In a matchbook containing detachable matches which require generation of friction between the head of each match and a slightly abrasive chemical coating in order to cause its ignition and burning, as a new feature of invention, improvements comprising:

unique structural features in a system of folds producing in the enclosure form of said matchbook cover a reinforced edge embodying an elongated ridge turned inwardly in facing opposition to a transverse plane, thereby creating an interior pocket in the otherwise sheetlike material structure of said matchbook cover;

an opening, a hole or aperture, located in an accessible portion of said elongated ridge;

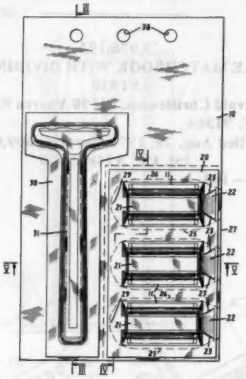
an upraised member on the movable portion of said matchbook cover so located as to become trapped in said opening when the endmost edge of said movable portion is inserted to a position under and behind said elongated ridge; a sloping or rounded side of said member allowing its unresisted insertion, while an opposite vertical side, blocked by a restraining edge of said opening, prevents direct withdrawal of said upraised member of said movable portion.

3,970,194

RAZOR BLADE CARTRIDGE AND DISPLAY ARTICLE

Clemens A. Iten, Staunton, Va., assignor to Philip Morris Incorporated, New York, N.Y.

Filed Jan. 8, 1975, Ser. No. 539,412
Int. Cl.² B65D 83/10; A45D 27/22; B26B 21/24
U.S. Cl. 206—228 6 Claims



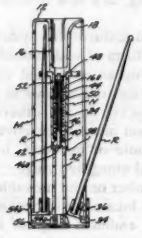
1. A display and dispenser article for razor blade cartridges of a type having at its rear face a dovetail slot for the endwise reception therein of a complemental razor handle key, said article comprising a main card, a blister secured to the front of the card having a pocket with an open rear face shaped to receive and having therein a said cartridge with its rear face with the dovetail slot at the rear, said blister having an outwardly extending channel portion registering with an end of said cartridge dovetail slot and having side walls diverging outwardly to a width larger than the end of the cartridge dovetail slot and a connecting wall between said side walls to guide readily the razor handle key into the slot, and said card having a section defined by weakened lines registering substantially with the open rear face of said pocket whereby removal of said section permits ready insertion of the handle key into engagement with and removal of the cartridge.

3,970,195

CROCHET NEEDLE STORAGE AND DISPENSING DEVICE

Veatrice Franklin, 1927 W. Harle, Anaheim, Calif. 92804

Filed Aug. 4, 1975, Ser. No. 601,414
Int. Cl.² B65D 85/24
U.S. Cl. 206—380 6 Claims



1. A device for use in storing a plurality of needles of various sizes and selectively dispensing a desired one of said needles, said needles having first ends on which crochet hooks of different sizes are defined and second ends of different transverse cross sections, said needles being of substantially the same lengths, said device including:

a. a cylindrical housing that includes a first end portion and a second open end, said first end portion including an inwardly extending tubular member that defines both a longitudinally extending cam surface and a portion of circular transverse cross section which cam surface is radially aligned with a longitudinal slot in said housing, with said tubular member having a first inwardly extending body shoulder therein;

b. a needle-holding assembly that includes first and second generally circular members and tubular means having a second body shoulder intermediately disposed therein, with said first generally circular member including a plurality of circumferentially spaced resilient clips that removably engage longitudinal sections of said needles adjacent said first ends thereof and said second generally circular member including a plurality of circumferentially spaced sockets that are in longitudinal alignment with said clips and removably engage said second ends of said needles, with said assembly being disposed within said housing and said tubular means rotatably and slidably engaging said portion of said tubular member of circular transverse cross section;

c. compressed spring means that at all times tend to move said assembly away from said tubular member;

d. stop means that extend between said first and second body shoulders and allow said spring means to move said assembly and needles to a first position in said housing where said assembly may be rotated without said needles removably supported therein contacting said cam surface;

e. a cap that closes said second end of said housing and is rigidly secured to said tubular means; and

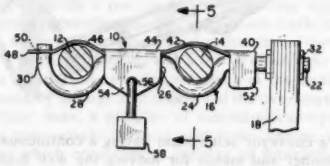
f. a plurality of indicia on said cap that visually indicates the size of a particular one of said needles that is aligned with said slot, and with said aligned needle being pivoted outwardly therethrough when said assembly and cap are manually forced towards said first end of said housing from a first position towards a second position where said needle is aligned with said slot and forced into sliding pressure contact with said cam surface, with said spring means automatically returning said assembly to said first position when said cap and assembly no longer have said manual force exerted thereon.

3,970,196

METHOD AND APPARATUS FOR SECURING A BICYCLE ON A BICYCLE RACK

Earl N. Legge, 11511 - 28th Ave. NE., Seattle, Wash. 98125

Filed May 23, 1974, Ser. No. 472,734
Int. Cl.² E05B 73/00
U.S. Cl. 211—5 5 Claims



1. A combination of a bicycle mounting bar on a bicycle rack and a bicycle security retainer wherein said bicycle mounting bar comprises:

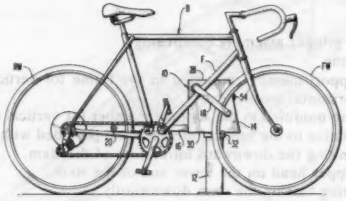
a. an inner end connecting with said bicycle rack;

b. a first positioning bend connecting with said inner end;

c. an upward bend connecting with said first positioning bend;

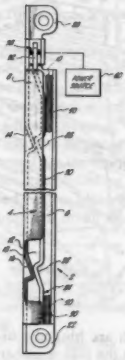
d. a second positioning bend connecting with said upward bend;
e. an upwardly directed bend connecting with said second positioning bend;
f. said bicycle security retainer comprises a first portion for fitting over said first positioning bend;
g. said bicycle security retainer comprises a central portion connecting with said first portion;
h. said bicycle security retainer comprises a second portion for fitting over said second positioning bend; and,
i. said bicycle security retainer comprises an end portion for cooperating with said upwardly directed bend to assist in positioning said bicycle security retainer on said bicycle mounting bar.

3,970,197
RACK AND BICYCLE LOCKING UNIT
Robert William Bale, Jr., 7305 Good Luck Road, New Carrollton, Md. 20784
Filed Nov. 5, 1974, Ser. No. 521,186
Int. Cl.² E05B *73/00*
U.S. Cl. 211—5 **11 Claims**



1. A bicycle rack and locking unit, comprising;
a. a generally vertically extending pedestal;
b. a lock box mounted to said pedestal; and
c. at least one arm member mounted to said lock box and extending in a direction substantially perpendicular to said pedestal, wherein,
said lock box includes mounting plate means, locking bar means pivotably mounted to said mounting plate means and displaceable relative thereto, and means within said lock box for locking said locking bar means to said mounting plate means, wherein,
said locking bar means comprising a generally cylindrical sleeve mounted to said mounting plate means, a generally U-shaped member which is displaceable relative to said sleeve with one leg of said U-shaped member being received within said sleeve, and means delimiting the relative axial and rotational displacement of said U-shaped member relative to said sleeve, said delimiting means comprising a generally U-shaped slotted track formed in said sleeve, with said one leg of said U-shaped member having a pin extension which engages said track, wherein,
said locking means are provided for locking said U-shaped member to said sleeve, and wherein,
said arm member includes a shaft which extends outwardly from said arm member in the displacement direction of said locking bar means.

3,970,198
PRINTED CIRCUIT BOARD RETAINER
Earle Francis Prater, Long Beach, Calif., assignor to The Bircher Corporation, Los Angeles, Calif.
Filed Feb. 3, 1975, Ser. No. 546,811
Int. Cl.² A47G *19/08*
U.S. Cl. 211—41 **16 Claims**

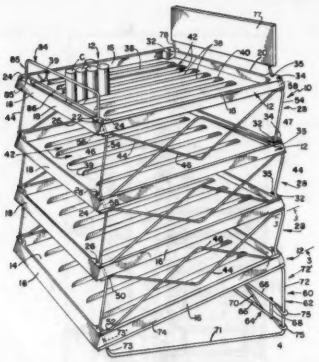


1. A printed circuit board retainer comprising:
activating means mounted on the housing member;
a housing member having a longitudinal axis;
a relatively rigid clamping member attached only at one end to the activating means, at least one of the housing member and the clamping member has at least one cam ramp while the other member has at least one complementarily follower adapted to operatively coact with the cam ramp to provide a transverse movement relative to the longitudinal axis of the clamping member, the other end of the clamping member being unrestrained relative to the housing member;
guide means maintaining one member in an operative relationship relative to the other member;
means for receiving a printed circuit board; and
means on said activating means for moving the entire rigid locking member in response to movement of the activating means relative to the housing member in the direction of the longitudinal axis whereby the clamping member exerts a lateral force for retaining the printed circuit board.

3,970,199
DISPLAY RACK
Howard J. Marschak, 865 W. North Ave., Chicago, Ill. 60622
Filed Jan. 27, 1975, Ser. No. 544,335
Int. Cl.² A47F *3/14*
U.S. Cl. 211—128 **12 Claims**

1. A display rack which is shipped and stored in a knock-down condition and is readily assembled without the use of extraneous fastening means, said rack comprising, a plurality of trays or shelves arranged to form a tier of same, each said tray or shelf having an opening adjacent each of the corners thereof, spacer side guard members between each pair of adjacent trays or shelves and extending substantially the length of said trays or shelves, each said spacer side guard member having an upwardly and downwardly extending end portion at the front and rear thereof which end portions are adapted to fit into the openings of two adjacent spaced trays or shelves one above the other to detachably support a plurality of trays or shelves in spaced relation one above the other, said spaced side guards having means adjacent said upwardly

and downwardly extending end portions which abut against the bottom and top of two adjacent spaced connected trays or shelves in a tier to limit and define the spaced distance between said two spaced connected trays or shelves, a base member on which the bottom tray or shelf is detachably secured, said base member having a rear member and spaced



side members which are hingedly or pivotally secured to the rear member so that the side members can be hinged inwardly toward each other to a collapsed position, said side members being positioned perpendicular to said rear member so that the bottom tray or shelf rests on top of said side members and said rear member when said base member supports said trays or shelves.

3,970,200

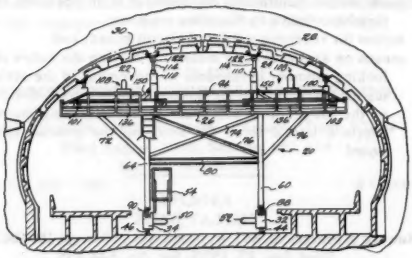
GANTRY

Ted G. Goetjen, Silver Spring, Md., assignor to George Hyman Construction Co., Bethesda, Md.

Filed Jan. 16, 1975, Ser. No. 541,646

Int. Cl.² B25J 3/00

U.S. Cl. 214—1 H **5 Claims**



1. A gantry for carrying out operations adjacent a ceiling structure comprising:

an upright supporting framework having an upper deck facing the ceiling structure;

wheel means carried by the framework below the deck for rendering the framework movable along a supporting surface;

at least one trolley wheel-mounted on the upper surface of the deck for movement therealong;

drive means for moving said trolley along the deck;

two pairs of generally upright jack means carried by said trolley, each of said jack means having a free upper end adapted to engage a work piece;

a platform mounting one of said pairs; means for moving said platform and the jacks mounted thereon in a horizontal direction transverse to the direction of movement of said trolley;

said trolley including a base forming a channel in which said platform slides;

said moving means including a hydraulic ram connected between said platform and said base of said trolley and a brace pivotably connected between said base and said platform.

3,970,201

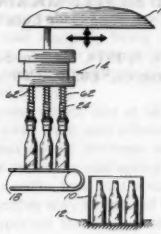
BOTTLE GRIPPER

Harold J. Keene, Milwaukee, Wis., assignor to Stowell Industries Inc., Milwaukee, Wis.

Filed June 23, 1975, Ser. No. 589,144

Int. Cl.² B65G 47/00

U.S. Cl. 214—1 BT **3 Claims**



1. A gripper assembly comprising,

a frame,

a support member mounted in the frame for vertical and horizontal movement,

a stem mounted in the support member for vertical motion relative to the support member and provided with means limiting the downward movement of the stem,

a gripper head on the lower end of the stem,

a spring biasing the stem downwardly,

means mounted in the gripper head for engaging the neck of a bottle,

means for actuating the last named means,

said stem including a relatively short section of limited flexibility permitting the gripper head to be deflected laterally to accommodate misalignment of the gripper head with a bottle,

said flexible section being sufficiently stiff to prevent appreciable swinging or pendulation of the bottle during rapid horizontal movement of the gripper head.

3,970,202

APPARATUS FOR STACKING FOLDED BOXES

Mariano Speggiorin, Renens, and Friedrich Wiedemann, Saint-Sulpice, both of Switzerland, assignors to J. Bobst & Fils S.A., Switzerland

Filed Sept. 27, 1974, Ser. No. 510,068

Claims priority, application Switzerland, Oct. 25, 1973, 15034/73

Int. Cl.² B65G 57/16, 57/08

U.S. Cl. 214—6.5 **13 Claims**

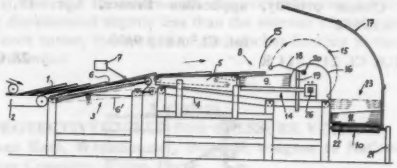
1. Apparatus for receiving folded boxes at the output from a machine and stacking the folded boxes comprising:

first and second laterally displaced box receiving stations for stacking folded boxes in first and second packs, respectively, said second station also functioning as a box sending station;

folded box conveyor means adjustable to alternately deliver boxes to each of said first and second receiving stations;

box turning over means for turning over said first pack of boxes at said first station and slowly moving said first pack of boxes in a vertical plane about a first axis to said

second station while boxes are being stacked in said second station and placing the first pack on said second pack to form a balanced stack when stacking in said second station is completed; and



means for removing said balanced stack from said second station.

3,970,203

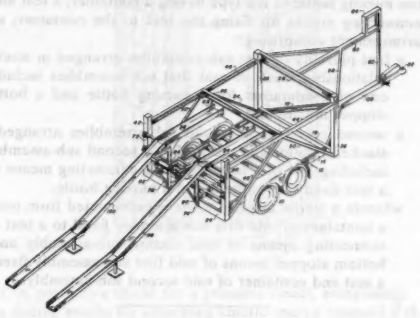
COMBINATION TRAILER

Wilson D. Watson, Jr., 3112 W. Illinois, Midland, Tex. 79701

Filed Apr. 28, 1975, Ser. No. 572,150

Int. Cl.² B60P *3/08*

U.S. Cl. 214—85.1 **9 Claims**



1. A trailer comprising:

a. a tandem running gear including ground engaging wheels,

b. a frame mounted on said running gear, said frame having

i. a rectangular portion approximately centered over said running gear, and

ii. a V-nose portion extending forward,

c. the frame positioned below the top of the ground engaging wheels of the running gear,

cd. the frame having a motor cut-out in the rear thereof,

d. a boat cradle mounted on said frame,

e. a boat in said cradle,

f. the bottom of said boat below the top of the wheels of the running gear,

g. a winch located at the apex of the V-nose,

h. said boat attached to the forward portion by said winch,

j. four upward-extending stanchions at each of the corners of said rectangular portion of the frame,

k. said stanchions located outward of said frame so the width of the frame at the stanchions is approximately equal to the width of the running gear at the wheels,

m. side rails on each side of the vehicle attached at the top of the stanchions,

n. a crossbar connecting the two front stanchions thereby forming a U-shaped opening,

o. a V-nose on the front of the upper portion extending from the two front stanchions forward,

p. an electrical winch on the upper V-nose,

q. rear braces extending from the bottom of the rear stanchion to the midpoint of the side rail,

r. forward brace extending from the bottom of the front stanchion to midpoint of the side rail,

s. a middle crossbeam hinged to the side rail where two braces meet on one side,

t. said mid-crossbeam latched to the side rail on the other side where two braces meet,

u. a right back gate hinged to the right rear stanchion,

v. a left back gate hinged to the left rear stanchion,

w. each of said gates extending to the edge of the motor cut-out,

x. each of said gates extending rearwardly at the edge of the cut-outs,

y. the top of said two gates connected with a rear gate bar,

z. a roller on the top of the rear gate bar,

aa. the mid-crossbeam having a bracket on each side,

bb. a track extending from each bracket to said rear gate,

dd. a camper having wheels thereon,

ee. the wheels of the camper vehicle in the track, and

ff. a pair of ramps carried by the frame and adapted to be attached to said gates, each lined up with the track so the camper can be rolled by the electric winch on the front of the upper frame up and down the ramp.

3,970,204

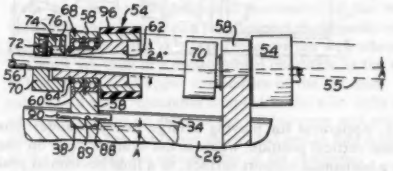
SKEWED ROLLER CONVEYOR

Karl Treasure Lutz, Gardner, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Jan. 27, 1975, Ser. No. 544,160

Int. Cl.² B65H *51/26*

U.S. Cl. 214—339 **13 Claims**



1. A conveyor for transporting cylindrical work pieces along a longitudinal axis thereof at a controlled speed, comprising:

a longitudinally extending frame;

a pair of longitudinal way members mounted above said frame with their longitudinal axis in generally parallel relation to one another and to the longitudinal axis of said frame;

a single shaft located generally above and with its axis generally parallel to the longitudinal axis of a respective one of said way members;

a plurality of cylindrical surfaced driving rollers having said shaft passing therethrough in driving relation thereto;

a first plurality of support fixtures upraised from said respective one of said way members with a first plurality of outer races of a first plurality of bearings supported one atop each of said first plurality of fixtures at an angle, A, from the axis of said shaft, said driving rollers being mounted to a first plurality of inner races of said first plurality of bearings, in a direction away from said respective one of said way members;

a plurality of cylindrical surfaced non-driven support rollers in one to one relation with and spaced apart from said driving rollers rotatingly supported generally above a respective other of said way members;

a second plurality of support fixtures upraised from said respective other of said way members with a second plurality of inner races of a second plurality of bearings supported by each of said second plurality of fixtures at an angle, A, from a line intersecting the axis of each of said support rollers and parallel to the axis of said shaft in a direction toward said respective other of said way

members, said support rollers being mounted to a second plurality of outer races of said second plurality of bearings;

means for adjustably moving said first plurality of bearings relative to said respective one of said way members and adjacent thereto;

means for adjustably moving said second plurality of bearings relative to said respective other of said way members and adjacent thereto; and

a motor drivingly coupled to said shaft.

3,970,205

APPARATUS FOR HANDLING LARGE AND HEAVY OBJECTS

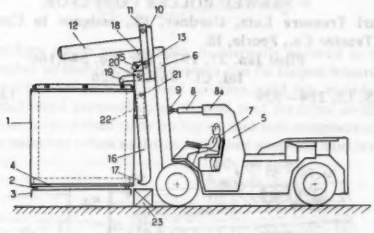
Louis Del Puppo, Saint-Genis-les-Ollieres, France, assignor to Societe Anonyme: SABLA, Dardilly, France

Filed Dec. 17, 1974, Ser. No. 533,629

Claims priority, application France, June 27, 1974, 74.23065

Int. Cl.² B66C 1/42

U.S. Cl. 214—652 **2 Claims**



1. Apparatus for moving a large heavy cylinder from an initial vertical position, wherein the cylinder rests on one end on a horizontal support surface, to a final horizontal position, said apparatus comprising,

a lift truck including an articulated generally vertically extending mast

a slide plate slidably mounted on said mast for movement in a generally vertical direction,

a chassis-cradle having upper and lower portions,

means for pivotally and removably connecting said chassis-cradle to said slide plate,

said lower end portion of the chassis-cradle including nipper means for engaging the lower edge of a vertically positioned cylinder and said upper end portion including releasable beak means for gripping the upper edge portion of a vertically positioned cylinder directly above and in alignment with said nipper means, whereby downward movement of said slide plate along said mast and rearward movement of said lift truck away from said cylinder, while the upper and lower edges of the cylinder are engaged by said nipper and beak means, causes said cradle to pivot about its pivotal connection with said slide plate, thereby to tip the cylinder adjacent its lower edge, from its vertical position towards the truck and into a horizontal position;

said slide plate including a generally horizontally extending projection and support member secured thereto dimensioned to penetrate into said cylinder through the upper edge thereof during tilting of the cylinder to its horizontal position, whereby movement of said slide plate vertically on said mast, after the cylinder is tilted to the horizontal position and the chassis-cradle is disconnected from the slide plate, will cause the projection to engage the interior sidewall of the cylinder and support the cylinder for transport by said lift truck in said horizontal position.

3,970,206

STACKABLE FEEDING ASSEMBLIES

Paule Gisele Morash, 17, Avenue La Bruyere, 78 Marly-le-Roi, France

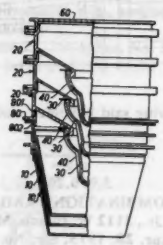
Continuation of Ser. No. 239,043, Feb. 29, 1972, abandoned.

This application Aug. 19, 1974, Ser. No. 498,661

Claims priority, application France, Apr. 19, 1971, 71.13672

Int. Cl.² A61J 9/00

U.S. Cl. 215—11 R **28 Claims**



1. A stackable arrangement for constructing a sterile single-use nursing bottle of the type having a container, a teat and a connecting means for fixing the teat to the container, said arrangement comprising:

a first plurality of first sub-assemblies arranged in stacked relationship, each of said first sub-assemblies including one of a container for a nursing bottle and a bottom stopper means, and

a second plurality of second sub-assemblies arranged in stacked relationship, each of said second sub-assemblies including one of a teat fixed to a connecting means and a teat fixed to a container of a nursing bottle,

wherein a sterile nursing bottle is constructed from one of a container of said first sub-assembly fixed to a teat and connecting means of said second sub-assembly and a bottom stopper means of said first sub-assembly fixed to a teat and container of said second sub-assembly.

3,970,207

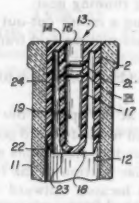
PLASTIC STOPPER FOR WINE BOTTLE OR THE LIKE

George W. Faulstich, San Carlos, Calif., assignor to Three Sisters Ranch Enterprises, San Carlos, Calif.

Filed May 27, 1975, Ser. No. 580,545

Int. Cl.² B65D 39/00

U.S. Cl. 215—296 **2 Claims**



1. A plastic stopper for a standard bottleneck adapted to be pulled with a standard cork screw comprising a top disc with a central hole, a pocket-forming portion below said disc having an inside diameter at the top coinciding with said hole, the interior of said pocket-forming portion being formed with a plurality of ridges, each ridge being transverse to the axis of said stopper to facilitate said cork screw being tightly received in said pocket, the interior of said pocket-forming portion tapering downwardly, said pocket-forming portion being air

and liquid-tight at the bottom, and a peripheral smooth, exterior skirt below said disc having a substantially constant outside diameter such as to fit tightly within said bottleneck and of a length about equal to that of said pocket-forming portion, there being an annular space between the exterior of said pocket-forming portion and the interior of said skirt, said central hole and the interior of said pocketforming portion being dimensioned slightly less than the exterior of said standard cork screw, the bottom of said pocket-forming portion being rounded.

3,970,208

PROTECTIVE SHIELD FOR PRESSURE VESSELS

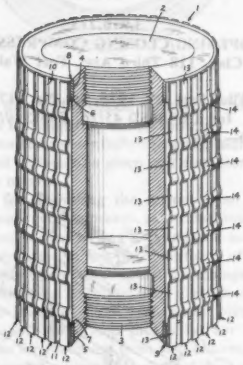
Herman Raes, Waasmunster, Belgium, assignor to National Forge Company, Irvine, Pa.

Filed Nov. 26, 1974, Ser. No. 527,195

Claims priority, application United Kingdom, Dec. 28, 1973, 59985/73

Int. Cl.² B65D 7/44

U.S. Cl. 220—3 **15 Claims**



1. A protective shield for a pressure vessel, comprising:

a ductile means for absorbing kinetic energy released if the pressure vessel fails by a portion of the pressure vessel breaking-off and tending to fly-away from the pressure vessel; said ductile means undergoing substantial deformation, but not breaking, when loaded by the portion of the pressure vessel tending to fly-away when the pressure vessel fails; and

means for attaching said ductile means to said pressure vessel so that if said pressure vessel fails, said ductile means will be loaded by said portion of the pressure vessel breaking-off and tending to fly-away;

said ductile means comprising a ductile arcuate segment of a strap; and said means for attaching said ductile means to said pressure vessel comprising a pair of rings, attached about opposite ends of the pressure vessel, and a pair of straight segments of said strap, each straight strap segment being connected to one of said rings and to an end of said ductile arcuate segment of said strap.

3,970,209

COLLAPSIBLE CONTAINER

Alan Raymond Baxter, 44 Karen Crescent, Hamilton 43, Ontario, Canada.

Filed Aug. 28, 1974, Ser. No. 501,403

Claims priority, application Canada, May 15, 1974, 199972

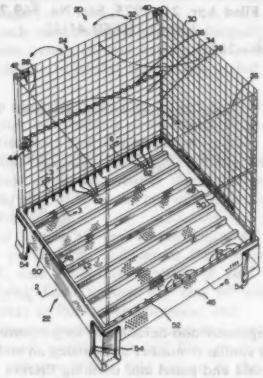
Int. Cl.² B65D 7/24; B65J 1/02; E05C 1/04

U.S. Cl. 220—6 **6 Claims**

1. A collapsible container comprising:

a rectangular base having four sided peripheral sill and a floor extending between sides of the sill, the floor being recessed below upper extremities of the sill to define a well and an opposed pair of the longer ones of said sill sides defining vertically extending slots facing inwardly of the base;

a pair of opposed side walls having vertical rods engaged in respective slots of the pair of sill sides and a respective one of a pair of horizontal rods attached to lower extremities of the respective vertical rods, each horizontal rod being housed within a respective one of the pair of sills to prevent withdrawal of the vertical rods from the pair of



sills and to permit both angular movement of the pair of walls and limited translational movement of the walls vertically, said angular and translational movements combining to permit the side walls to enter the well whereby the walls are then in a disassembled condition in the well below the level of upper extremities of the sill; and

a pair of end walls releasably coupled to the side walls and adapted to stand on sides of the sill between said pair of sill sides with the container assembled and to fold relative to the side walls for disassembly of the container.

3,970,210

HEAT INSULATION LINED TANK FOR LOW TEMPERATURE LIQUIDS AND METHODS OF MANUFACTURING THE SAME

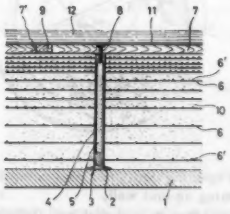
Kihei Katsuta, Nagasaki, Japan, assignor to Mitsubishi Jukogyo Kabushiki Kaisha, Japan

Filed June 12, 1973, Ser. No. 369,135

Claims priority, application Japan, June 27, 1972, 47-64307; Apr. 23, 1973, 48-45974

Int. Cl.² B65D 87/24; B63B 25/08

U.S. Cl. 220—9 LG **13 Claims**



1. A storage tank for a low-temperature liquid comprising an outer tank shell wall having an interior surface, a liquid-impervious layer spaced from said interior surface of said tank shell wall, a heat insulation layer between said tank shell wall and said liquid-impervious layer, a multiplicity of wire net

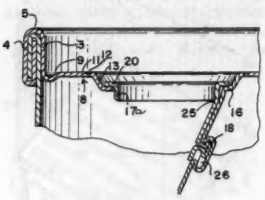
layers embedded in and extending across an insulation layer each being substantially parallel to and in spaced relation with said interior surface, said wire net layers each including crossing longitudinal and lateral wires defining mesh opening areas therebetween which decrease in size in a direction from said tank outer wall toward said liquid-impervious layer.

3,970,211

NON-REMOVABLE TAB CONNECTION

George D. LaCross, Burbank, Ill., assignor to Continental Can Company, Inc., New York, N.Y.

Filed Apr. 21, 1975, Ser. No. 569,711
Int. Cl.² B65D *41/32*
U.S. Cl. 220—267 8 Claims



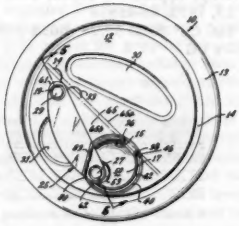
1. An improved non-detachable easy-opening end closure for a can or similar container comprising an end panel, a score formed in said end panel and defining therein a flap element adapted to be torn away from said end panel to provide an opening, a tab element superposed with respect to said flap, flap retention means for retaining said flap attached to said end closure subsequent to opening and tab attachment means attaching said tab to said flap, said attachment means providing a lost motion between said flap element and said tab element during opening of said end closure.

3,970,212

EASY OPENING ECOLOGY END WITH RETAINED TEAR STRIPS

Omar L. Brown, Dayton, Ohio, assignor to Ermal C. Fraze, Dayton, Ohio

Filed June 10, 1974, Ser. No. 477,678
Int. Cl.² B65D *17/20*
U.S. Cl. 220—269 20 Claims



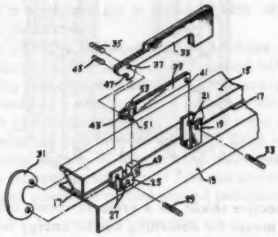
1. An easy opening container wall comprising:
means forming an end wall,
a line of weakness in said end wall defining a tear portion at least partly removable from said end wall to form a pour opening,
a second line of weakness spaced from said line of weakness and defining a vent strip forming a vent opening smaller than the pour opening in a portion of said end wall other than in said tear portion,
tab means having end portions for attachment to each of said tear portion and said vent strip for rupturing said lines of weakness,
means attaching said tab means to each of said tear portion and said vent strip whereby manipulation of said tab means ruptures both score lines and forms an exposed edge on said tear portion and the portion of said end wall from which said tear portion was removed,
each of said first and second line of weakness including means to prevent complete separation of said tear portion and vent strip from said end wall and defining a hinge line whereby the ruptured but retained tear portion and vent strip may be folded against said end wall,
one of said end portions of said tab means being closer to said hinge line than the other of said end portions, and
protective means provided in each of said tear portion and the end wall from which said tear portion was removed for reducing the possibility of laceration by the user by the exposed edge of said tear portion and the exposed edge of the end wall from which said tear portion was removed.

3,970,213

QUICK OPENING/CLOSING COMPRESSION LATCH

Charles L. Clay, 118 Third Ave., Fort Walton Beach, Fla. 32548

Filed Sept. 29, 1975, Ser. No. 617,776
Int. Cl.² B65D *45/16*; E05C *19/12*
U.S. Cl. 220—324 4 Claims

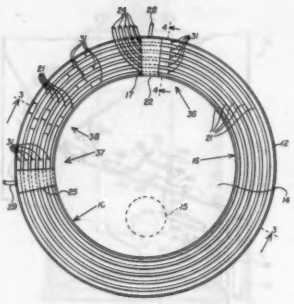


1. In a compression latch positioned within the envelope of an ammunition shipping container including a lid and a walled body portion with a resilient gasket therebetween and operating in the same plane as the wall of the container, the improvement comprising a first U-shaped pivot clip fixedly attached to the wall of said body portion, said first pivot clip having aligned openings for receiving a pin therethrough, a second U-shaped pivot clip fixedly attached to the wall of said body portion in spaced alignment with said first pivot clip, said second pivot clip having aligned openings for receiving a pin therethrough, a C-clip having one end pivotally attached to said first U-shaped pivot clip, a handle having aligned openings in the forward end thereof, the other end of said C-clip being pivotally attached to the forward end of said handle with a pin member through the aligned openings therein, a cross bar having its rearward end pivotally connected to said second U-shaped pivot clip, a pin affixed in the forward end of said cross bar and extending outwardly beyond the walls thereof, a slot in the forward end of said handle for engaging the extending portions of the pin in said cross bar, and a tab fixedly attached to the lid of the container and extending outwardly therefrom into the area between said first and second U-shaped pivot clips whereby clockwise movement of said handle after engagement of the slot therein with the pin in said cross bar causes said cross bar to press against the top of said tab and force the lid against the gasket positioned on the wall of the body portion of the container.

3,970,214
METHOD AND APPARATUS FOR HANDLING COILED SPRINGS

George W. Thimot, Marlboro, Mass., assignor to Hudson Lock, Inc., Hudson, Mass.

Filed July 7, 1975, Ser. No. 593,211
Int. Cl.[2] B23Q 7/12
U.S. Cl. 221—1 17 Claims

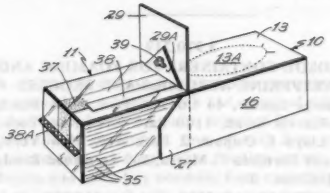


1. Apparatus for feeding coiled springs and comprising:
source means for supplying coiled springs;
receiver means for sequentially receiving individual cylindrical coiled springs of a given coil diameter supplied by said source means;
ramp means for delivering the springs from said source means to said receiver means, said ramp means defining open channel means having a cylindrical surface curvature that conforms to the outer surfaces of the coils of given coil diameter so as to retain the springs in positions wherein their axes coincide with a given delivery line during their travel between said source means and said receiver means, said ramp means further defining removal means for removing from said channel means any moving entangled composite group of the springs having a center of gravity shifted horizontally from said given delivery line; and
drive means for moving the springs between said source means and said receiver means.

3,970,215
DISPENSING PACKAGE FOR MOISTENED TISSUES

Edwin C. McLaren, Apple Valley, and Howard R. Schneider, Minneapolis, both of Minn., assignors to Hoerner Waldorf Corporation, St. Paul, Minn.

Filed Jan. 24, 1975, Ser. No. 543,962
Int. Cl.[2] A47K 10/20
U.S. Cl. 221—45 1 Claim

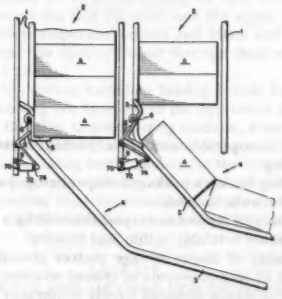


1. A dispensing package for moistened tissues or the like, said tissues arranged in a folded stacked array, comprising:
a sheet of flexible moisture proof film surrounding said stacked array of tissues, said sheet having overlapping longitudinal edges arranged on the top of said stacked array to form an opening through which said tissues may be removed, said sheet also having sealed ends to complete the enclosure of said stacked array;
means sealing said overlapping edges and adapted to allow said edges to be opened for removal of the tissues;
an outer enclosure carton made from foldable paperboard or similar sheet-like material, said carton being substantially rectangular in cross section and having a top surface, a bottom surface, opposed lateral side panels and closed with opposed rectangular end panels;
said top surface having formed therein a panel defined by frangible edges adapted to be removed to provide access to said sealing means and said stacked array of tissues in said package;
said end panels comprising minor flaps hingedly connected to said side panels of said carton, said minor flaps inwardly foldable to lie flat against the sealed end of said film;
a major flap hingedly connected to said top surface of said outer carton and foldable downwardly to lie in overlapping relation with said minor flaps;
said minor flaps having cut-away portions at the upper end thereof, said cut-away portions thereby exposing a section of said major flap to the end of said film surrounding said stacked array;
said exposed section on said major flap overlapping said cut-away portions of said minor flaps being inwardly embossed, said embossed portion of said major flap thereby lying flush against the end of said film and stacked array in final closed position; and
a mass of adhesive positioned between and contacting both said embossed portion and said film wrapper to retain said film wrapper within said carton as the tissues are removed therefrom.

3,970,216
COIN CONTROLLED VENDING APPARATUS

Don E. Rainey, 456 S. Dixie Highway, East Pompano Beach, Fla. 33060

Continuation of Ser. No. 188,543, Oct. 12, 1971, abandoned, which is a division of Ser. No. 816,276, April 15, 1969, Pat. No. 3,702,655. This application Sept. 9, 1974, Ser. No. 504,158
Int. Cl.[2] B65G 59/00
U.S. Cl. 221—125 8 Claims



1. Vending apparatus for storing and dispensing articles which comprises:
i. a cabinet having a multiplicity of vertically arranged chutes for receiving the articles in stacked horizontal position;
ii. Transposer means pivotally supported at the lower ends of each chute to shift the lowermost articles in the chutes from horizontal position to downward discharge dispensing position; and,

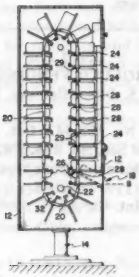
iii. an hydraulic control system to activate said transposer means, said hydraulic control system comprising:
a. a primary fluid body;
b. a secondary fluid body;
c. cylinder and reciprocating plunger means interposed between said bodies;
d. means actuated by said secondary fluid; and,
e. fluid limiting means for selectively limiting the volume of fluid available to said primary fluid body comprising a cylinder cooperating with said primary fluid body, and a cooperating piston reciprocable between retracted and extended positions within said cylinder and defining the volume limits of fluid available to said primary fluid body; whereby, said plunger means is operable in accordance with the available volume of fluid.

3,970,217

COIN-OPERABLE PACKAGED DIAPER DISPENSING MACHINE

William E. Culbertson, and Linda R. Culbertson, both of Aurora, Ill., assignors to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Dec. 23, 1975, Ser. No. 643,789
Int. Cl.[2] B65G *47/38*
U.S. Cl. 221—80 **3 Claims**



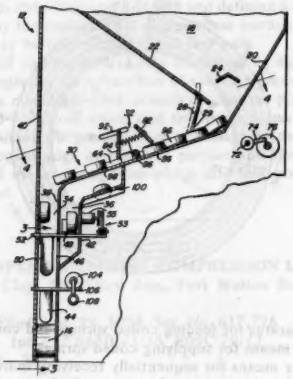
1. A coin-operable automatic packaged diaper dispenser comprising:
a housing having a packaged diaper delivery opening in one of the walls thereof;
a plurality of endless conveyors drivable by a common shaft mounted rotatably within said housing;
a plurality of diaper storage shelves pivotably carried by each of said conveyors in spaced relation;
deflector means mounted fixedly within said housing above said delivery opening in the path of movement of said shelves and engageable serially with the rear of each of said shelves to thereby effect pivotal movement of the shelf and the discharge of the packaged diaper stored thereon to said delivery opening;
spring means being operably connected with each of said shelves for returning the pivoted shelf to it original position;
and a coin-actuable electric motor operably connected to said drive shaft for incrementally moving a selected conveyor to thereby move a shelf thereon to a diaper discharge station adjacent said delivery opening.

3,970,218

CAP SELECTING AND FEEDING MECHANISM

Wing J. Lee, 1322 Neck Road, Brooklyn, N.Y. 11229

Filed Feb. 20, 1975, Ser. No. 551,411
Int. Cl.[2] B65H *9/00*
U.S. Cl. 221—157 **16 Claims**



1. Apparatus for storing and dispensing articles one at a time in a predetermined orientation, comprising a cabinet having a hopper, fixed channel means mounted within said cabinet for guiding movement of said articles from the hopper, a storage compartment into which the articles are deposited from the channel means, a delivery chute into which the articles are discharged from the storage compartment, guide means for reorientating articles during movement through the channel means to supply articles to the storage compartment in the same orientation, feed controlling gate means for respectively regulating infeed of the articles to the channel means from the hopper and outfeed of the articles from the storage compartment to the delivery chute, sensing means for detecting depletion of articles stored in the storage compartment by predetermined amount and control means connecting the sensing means to the feed controlling gate means for intermittently blocking infeed of articles to the storage compartment and outfeed therefrom in accordance with the effect of said reorientating operation on the supply of articles to the storage compartment.

3,970,219

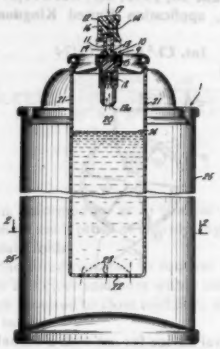
AEROSOL CONTAINERS FOR FOAMING AND DELIVERING AEROSOLS AND PROCESS

Joseph George Spitzer, 44 Coconut Row, Palm Beach, Fla. 33480; Marvin Small, 1100 Park Ave., New York, N.Y. 10028; Lloyd I. Osipow, 2 Fifth Ave., New York, N.Y. 10011, and Dorothea C. Marra, 107 Fernwood Road, Summit, N.J. 07901

Filed Mar. 3, 1975, Ser. No. 554,388
Int. Cl.[2] B65D *83/14, 83/00*
U.S. Cl. 222—1 **51 Claims**

15. A process for foaming a liquid aerosol composition within an aerosol container prior to expulsion from the container, with the result that a foamed aerosol composition is expelled from the container, comprising bubbling a propellant gas into liquid aerosol composition in the container at a suffi-

cient pressure and in a sufficient amount to foam the liquid aerosol composition while under confinement within the container, and then expelling the resulting foamed aerosol composition under propellant gas pressure within the container.



3,970,220

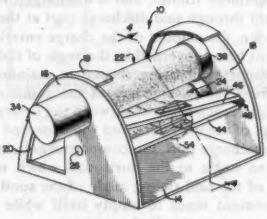
COLLAPSIBLE TUBE SQUEEZING DEVICE

Cecil Julius Spears, 112 McFarland Road, Enfield, N.C. 27823

Filed Aug. 26, 1974, Ser. No. 500,444

Int. Cl.[2] B65D *35/28*

U.S. Cl. 222—102 **4 Claims**



1. A collapsible tube squeezing device comprising a frame having open sides, a bottom wall and a pair of sidewalls;

first and second squeeze roller mounted for rotation in the sidewalls of the frame, one of said first and second squeeze rollers having roller rotating means connected thereto and extending normally from one of the sidewalls of the frame, and tube crown squeezing and holding means carried by said sidewalls of the frame in substantial alignment with the tube receiving space between the pair of squeeze rollers wherein said tube crown squeezing and holding means comprises a base member rigidly connected between the pair of sidewalls and a crusher bar pivotally mounted adjacent one end to one end of the base member.

3,970,221

APPLICATOR SYSTEM FOR FLUIDS

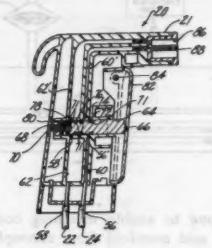
Barry Fleischer, 16170 Roanoke, Southfield, Mich. 48075

Division of Ser. No. 349,751, April 10, 1973, Pat. No. 3,880,333. This application Jan. 14, 1975, Ser. No. 540,791

The portion of the term of this patent subsequent to Apr. 29, 1992, has been disclaimed.

Int. Cl.[2] B67D *5/60*

U.S. Cl. 222—145 **6 Claims**



1. An applicator for dispensing a fluid under pressure, comprising:

a. a housing,

b. a first channel for storing a pressurizing medium formed within the housing, the channel having an inlet and an outlet,

c. an upper channel formed in the housing having an inlet thereinto and an outlet, the inlet of the upper channel being laterally displaced from the outlet of the first channel,

d. a first chamber for storing a fluid formed within the housing, the chamber having an inlet and an outlet,

e. an upper chamber formed in the housing having an inlet thereinto and an outlet, the inlet of the upper chamber being laterally displaced from the outlet of the first chamber,

f. an internal transverse housing separating the first chamber from the upper chamber and their, respective, outlet and inlet,

g. axially slidable means disposed in the internal transverse housing,

h. a plurality of sealing means associated with the axially slidable means for normally sealing off fluid communications between the first chamber and the upper chamber through their respective outlets and inlets and the first channel and the upper channel through their respective outlet and inlet,

i. quick action means including biasing means for pulsatingly regulating the flow out of the applicator such that there is a first flow of pressurizing medium, a second flow of fluid, and a final flow of pressurizing medium, said means for regulating being disposed in the internal transverse housing, and wherein movement of said sealing means provides fluid communication between the first chamber and the first channel and upper channel.

3,970,222

APPARATUS AND METHOD FOR INITIATING FORMATION OF A FILAMENT OF COATING LIQUID

Peter Leonard Duffield, Chillicothe, Ohio, assignor to The Mead Corporation, Dayton, Ohio

Filed Aug. 4, 1972, Ser. No. 277,997

Int. Cl.[2] B65D *83/14*

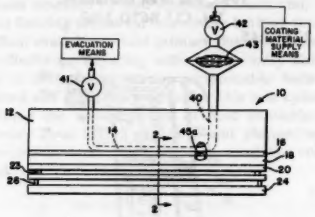
U.S. Cl. 222—148 **6 Claims**

1. In a jet drop coating system comprising a coating head provided with a plurality of orifices and a manifold for delivery of liquid coating material to said orifices, improved coating material supply apparatus comprising:

a. means for supplying said coated material at a pressure greater than that required for liquid jet formation at the

exits of said orifices and at a volume rate greater than the rate of escape of air through all of said orifices at said liquid jet formation pressure, and

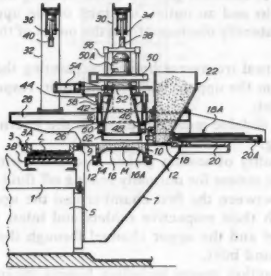
b. a compression chamber between said supply means and said manifold, said compression chamber having sufficient volume to enable incoming coating material to pressurize said manifold from atmospheric pressure to said liquid jet formation pressure while air is escaping from said orifices and prior to arrival of said coating material at any of said orifices.



3,970,223
MATERIAL METERING UNITS

Enrico Longinotti, Florence, Italy, assignor to Longinotti S.p.A., Italy

Filed Mar. 24, 1975, Ser. No. 561,655
Claims priority, application Italy, Apr. 4, 1974, 9392/74
Int. Cl.² G01F 11/18
U.S. Cl. 222—306 15 Claims



1. A metering unit for semi-dry material, comprising means for delimiting a charge of semi-dry material of predetermined volume and shape and for transferring said charge to a discharge position beneath which a mold to be charged can pass, said means including a surface permeable to air but impermeable to the semi-dry material; and suction means for creating a suction effect through said permeable surface whereby semi-dry material of the charge can be held against said surface during transfer to the said discharge position; said means for delimiting and transferring the material charge further comprising an adjustable capacity dosage container within which the charge is delimited, the container including a grid bottom permeable to air but impermeable to the semi-dry material, and side walls extending from the bottom to define a material opening; a suction pick-up member carrying said permeable surface; and pick-up member transfer means for moving the suction pick-up member between a charge pick-up position, in which its permeable surface contacts through said material opening the material charge delimited within the dosage container, whereby to enable pick-up of charge, and a position in which the charge is in its discharge position.

3,970,224
SPOIL REMOVAL DEVICES FOR TUNNELLING MACHINES

Cyril Gordon Chatham, Harpenden, and Kenneth Long, Petts Wood, both of England, assignors to National Research Development Corporation, London, England

Filed June 20, 1973, Ser. No. 371,878
Claims priority, application United Kingdom, June 22, 1972, 29348/72
Int. Cl.² G01F 11/24
U.S. Cl. 222—370 5 Claims

1. A spoil-removal device for use with a tunnelling shield in which excavating means operates within a substantially sealed-off and pressurised region and in which solid spoil has to be extracted from the excavating region, said spoil-removal device comprising:

a. a cylindrical chamber which has an inlet port open to the excavating region and a discharge port open to a position outside the region; and

b. a multi-compartment rotary member adapted to rotate in said chamber in sealed co-operation therewith, each compartment of said rotary member being arranged to pass said inlet port and said discharge port in turn and being arranged not to be open to both ports at the same time, said rotary member having an axis of rotation parallel to the longitudinal axis of the tunnel being formed by the tunnelling shield and comprising a multi-bladed helical screw, the said compartments being formed between consecutive blades, the arrangement being such that a charge of solid spoil enters each compartment in turn through said inlet port, is passed along the compartment as the member rotates, and is discharged from the compartment through said discharge port at the other end of the device, the amount of the charge entering each compartment being governed by the angle of slide of the spoil, the compartment being shaped to maintain the charge away from the outer edges of the compartment before said edges reach the seal between the rotary member and the edge of the inlet port, and when located in the vicinity of the discharge port, the compartment being arranged to attain an angle to the horizontal which is generally in excess of the said sliding angle of the spoil, whereby the compartment tends to empty itself while the compartment is open to the discharge port.

3,970,225
VALVE FOR A FLUID DISPENSER

Harvey Philip Jeal, Stevenage, and David John Sheffield, Hemel Hempstead, both of England, assignors to Avdel Limited, England

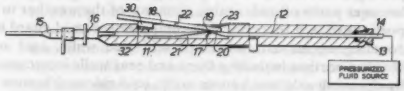
Filed Dec. 20, 1974, Ser. No. 534,762
Claims priority, application United Kingdom, Dec. 20, 1973, 59026/73
Int. Cl.² B67C 3/28
U.S. Cl. 222—529 6 Claims

1. A valve comprising:

a flexible tube of resilient material, said tube normally resiliently assuming a shape providing an open bore through which fluid can pass, said open bore having a cross-sectional shape which is continuously curved; and

operating means for selectively squeezing a region of the tube in order to close said bore and for releasing said region of said tube in order to allow the bore to open,

said region of said tube which is squeezed and released having two diametrically opposed longitudinal folds whereby the cross sectional shape of said bore within said



region is deformed so as to present two opposing sides which meet each other at sharply angled corners located within said folds,

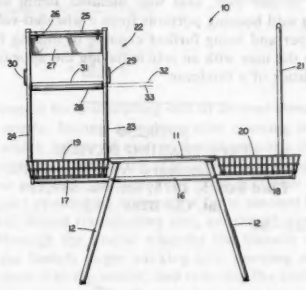
whereby the force required to squeeze said opposing sides together and close said bore within said region is less than the force required to close said bore within the remainder of said tube.

3,970,226

APPARATUS AND METHOD FOR HOLDING ONE END OF A SHEET TO BE FOLDED

John B. Lanagan, Indianapolis, and Stephen H. Tilson, Noblesville, both of Ind., assignors to The New Folding System Incorporated, Indianapolis, Ind.

Filed July 28, 1975, Ser. No. 599,627
Int. Cl.² A41H *33/00*
U.S. Cl. 223—37 **8 Claims**



1. An apparatus for use in a sheet folding operation and for holding an end portion of a sheet to be folded comprising:

a frame;

a first bar with a longitudinal axis mounted to said frame;

a second bar swingably mounted to said frame in parallel relationship to said first bar, said second bar having a longitudinal axis above and to the side of said axis of said first bar; and,

means swingably mounting said second bar to said frame operable to allow said second bar to rest adjacent said first bar to grip a sheet therebetween when said end portion extends around said second bar and then between said first bar and said second bar to a position in contact with said sheet which is pulled taut horizontally away from said second bar past and beneath said first bar.

3,970,227

SPRING LOOP KEY RING AND BELT ATTACHMENT

Gilbert F. Hardy, 8191 Sterling Ave., Huntington Beach, Calif. 92646

Filed Feb. 21, 1975, Ser. No. 551,900
Int. Cl.² A45F *5/02*
U.S. Cl. 224—5 R **2 Claims**

1. A key holder for use on a belt and comprising a belt hook formed by a pair of spaced flat legs joined by a shallow bend and adapted to retain the hook on the belt; a key keeper having a large half loop adapted to receive keys, a small half loop spaced from the large loop and engageable with the belt hook, a straight first keeper side rod connecting between said large and small keeper half loops, a discontinuous straight second keeper side rod connecting between the said large and small keeper half loops, and securing means for releasably securing together the discontinuous straight second keeper side rod, said securing means being fixedly attached to a portion of the discontinuous side near the small loop and further precluding passage of keys from the small loop at one end thereof; and means on the belt hook for retaining a key keeper including a flat loop extending from one spaced flat leg, a flat loop end bearing resiliently against said one spaced flat leg, and a flat leg extension on the other flat leg in contact with the outer surface of the loop and extending away from the shallow bend beyond the flat loop, whereby said key keeper is retained by said flat loop and said legs are resilient so as to spring apart to separate the flat loop and the leg for the insertion of a belt therebetween.

3,970,228

FLASHLIGHT AND FLASHLIGHT HOLDER

Donald A. Keller, Temecula, Calif., assignor to VSI Recreational Products, Fullerton, Calif.

Filed Feb. 26, 1975, Ser. No. 553,230
Int. Cl.² A45F *5/00*
U.S. Cl. 224—5 H **2 Claims**

1. In combination with the flashlight of the type having a body, an on-off switch housing on the body extending a height therefrom, a head on the body having a diameter greater than the body, an improved flashlight holder comprising:

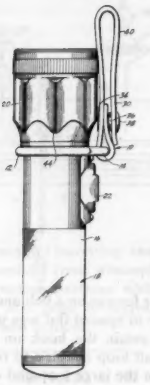
a. a ring having a diameter greater than the diameter of the body but less than the diameter of the head and less than the diameter of the body plus the height of the on-off switch housing;

b. a bridge of the ring defining a pair of generally parallel legs extending in a direction outwardly away from the center of the ring and merging into the balance of the ring, and a bight connecting the legs;

c. a strap for attaching a flashlight to a person having one end looped around the bight and attached to itself to define a closed loop loosely securing the strap to the ring and permitting the ring to rotate in the strap about the axis of the bight; and

d. the distance measured from a point on the ring opposite the bight to the most proximate surface of the strap on the inside of the bight being greater than the diameter of the body of the flashlight and the height of the on-off switch

housing, and the distance between the legs of the bight being greater than the width of the on-off switch housing; whereby, the on-off switch housing can pass through the bridge for inserting and removing the flashlight from the holder and the holder interferes with the on-off switch



housing when such housing is out of register with the bridge to lock the flashlight to the holder when the on-off switch housing is below the ring and hold without such locking the flashlight when the on-off switch housing is above the ring.

3,970,229

CONVERTIBLE SADDLE BRIEF CASE

Sidney Norinsky, 110 West 96th St., New York, N.Y. 10025

Continuation-in-part of Ser. No. 547,655, Feb. 6, 1975. This application Feb. 6, 1975, Ser. No. 547,656

Int. Cl.[2] B62J 9/00

U.S. Cl. 224—31 **1 Claim**

1. A convertible receptacle for use with wheeled vehicles having a support member, comprising, in combination: a first housing portion operationally defining a first receiving compartment therewithin; a second housing portion operationally defining a second receiving compartment therewithin; a web portion integral with and interconnecting said first and second housing portions; a first handle portion associated with and secured to said first housing portion; a second handle portion associated with and secured to said second housing portion; and snap means integral with said housing portions for removably holding said first and second housing portions in a proximate relationship with respect to one another; said first housing portion including front and rear walls interconnected by opposing side and bottom walls, said side and bottom walls being formed with a plurality of folded portions thereof to permit expansion of said front and rear walls away from one another, a flap member integral with said rear wall extending in overlapping relationship with respect to said front wall, thereby covering uppermost extremities of said front and side walls and an access opening defined thereby, a fastener member integral with said front wall and accessible to a user of the convertible receptacle, a fastener portion of said flap member extending to said fastener member, said fastener portion including fastening means cooperative with respect to said fastener member for enabling the user to secure said fastener member and said fastening means together, and a pair of guard means integral with and depending from opposite inside border surfaces of said flap member, said guard means comprising material capable of folding upon itself and expanding to cover paths of undesirable elements of the weather to inner portions of said first receiving compartment, said guard means covering upper extremities of said side walls, said second housing portion including front and rear walls interconnected by opposing side and bottom walls, said side and bottom walls being formed with a plurality of folded portions thereof to permit expansion of said front and rear walls away from one another, a flap member integral with said rear wall and extending in overlapping relationship with respect to said front wall, thereby covering uppermost extremities of said front and side walls and an access opening defined thereby, a fastener member integral with said front wall and accessible to a user of the convertible receptacle, a fastener portion of said flap member extending from said rear wall over said flap member to said fastener member, said fastener portion including a fastening means cooperative with respect to said fastener member for enabling the user to secure said fastener member and said fastening means together, and a pair of guard means integral with and depending from opposite inside border surfaces of said flap member, said guard means comprising material capable of folding upon itself and expanding to cover paths of undesirable elements of the weather to inner portions of said first receiving compartment, said guard means covering upper extremities of said side walls, said web portion being formed with handle openings therethrough adjacent said first and second housing portion rear walls, said first and second handle portions extending through said handle openings and being capable of movement between usable and retracted positions, said first and second handle means being shaped to permit their being comfortably and simultaneously grasped by one hand of the user, said web member being capable of supporting said housing portions from a wheeled vehicle support member and being further capable of folding from view to provide the user with an article having the appearance and characteristics of a briefcase.

3,970,230

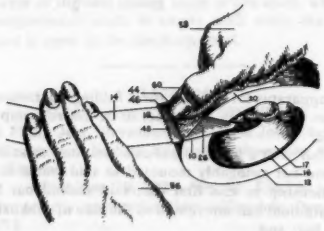
TAPE TEARING DEVICE

Alexander Horn, 624 Hazelhurst Ave., Merion, Pa. 19066

Filed Feb. 5, 1975, Ser. No. 547,124

Int. Cl.[2] B26F 3/02

U.S. Cl. 225—65 **4 Claims**



1. In a roll tape tearing device removably applied to a roll of tape having a thickness defined between an outer periphery and an inner core, the said tearing device including:

A. a web transversely overlying the outer periphery of the tape roll,

1. said web having a length slightly greater than the width of the tape roll;

B. a pair of spaced, generally parallel legs depending from the transverse edges of the web,

1. said legs extending in length a distance that is greater than the thickness of the roll of tape,

2. said legs terminating downwardly in a shoulder construction,

a. said shoulder construction including inwardly projecting shoulders, the space between the shoulders normally being less than the width of the tape roll whereby the shoulders act to retain the dispenser in association with the tape roll at the said core thereof,

b. the shoulder construction comprising an inwardly inclined planar surface the inwardly inclined planar surface contacting the outer periphery of the tape at an angle of less than 90° to spread a portion of the legs when the tearing device is applied to the roll of tape; and

C. cutter blade means carried by the web to sever the tape.

3,970,231

METHOD AND DEVICE FOR STARTING UP INJECTOR NOZZLES

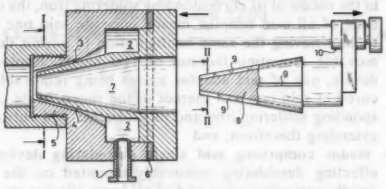
Hans-Jürgen Strutz, and Ingolf Jacob, both of Bobingen, Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Aug. 5, 1974, Ser. No. 494,510

Claims priority, application Germany, Aug. 4, 1973, 2339603

Int. Cl.² B65H *17/32*

U.S. Cl. 226—7 **13 Claims**



1. A process for introducing one or several threads into an injector nozzle, having a sucking inlet opening or openings through which a flow of motive fluid transports the threads, which comprises introducing the threads to the sucking inlet opening or openings, arranging the cross-sectional area of the sucking inlet opening or openings, a finite amount larger than the normal thread transporting size, causing the motive fluid to flow through the nozzle whereby the threads are sucked through the finitely larger sucking inlet opening or openings to insert them into the nozzle, and reducing the cross sectional area of said inlet opening or openings to their transporting size for transporting the threads through the nozzle.

3,970,232

WELDING MACHINE

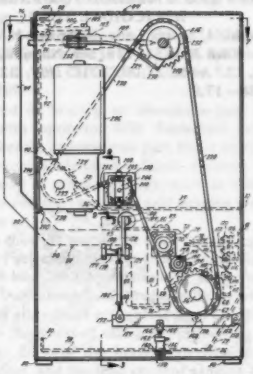
Vernon L. Melton, 9209 Meadowbrook Lane, Overland, Mo. 63114

Filed Dec. 16, 1974, Ser. No. 532,898

Int. Cl.² B23K *37/02*

U.S. Cl. 228—7 **32 Claims**

1. A welding machine which has rotatable work-supporting means that can rotate work about a given axis while a welding operation is being performed on said work, a pivot, a movable mounting for said pivot which holds the axis of said pivot so it extends transversely of said given axis and which can be moved during said welding operation to dynamically move said axis of said pivot radially relative to said given axis, a position-changing member for said mounting for said pivot which is rotatable about a further axis, that extends transversely of said pivot, and which can move said pivot mounting during said welding operation, a support for a welding torch that is supported by and is rotatable about said pivot during said welding operation to dynamically rotate said welding torch about said pivot, said support for said welding torch moving with said pivot whenever said position-changing member for said pivot mounting causes said pivot mounting to move said pivot radially relative to said given axis, whereby said pivot mounting can hold said pivot, and hence said welding torch, adjacent rotating work held by said rotatable work-supporting means and also can change the radial position of said axis of said pivot, and hence of said welding torch, relative to said given axis during said welding operation, driving means to rotate said rotatable work-supporting means and



thereby provide relative movement between said support for said welding torch and said rotatable work-supporting means and hence to provide relative movement between said welding torch and said rotating work, and thereby enable said welding torch to confront a predetermined relatively-moving surface of said rotating work, and support-moving means that includes a mechanical linkage connected to said support, said linkage engaged by a rotatable member which is rotatable during said welding operation to move said support for said welding torch about said pivot and thereby cause said welding torch to rotate about said pivot and hence to move angularly relative to said work-supporting means, said driving means also rotating said rotatable member of said support-moving means, said position-changing member for said pivot mounting being adapted to coact with said support-moving means, during the time said driving means is providing said relative movement between said welding torch and said rotating work, to dynamically vary the angular position of said support for said welding torch, and hence of said welding torch, relative to said predetermined surface of said rotating work and also to dynamically vary the radial position of said pivot, and hence of said welding torch, relative to said given axis in a predetermined manner, whereby a weld can be formed at said predetermined surface of said rotating work without undercutting any portion of said rotating work.

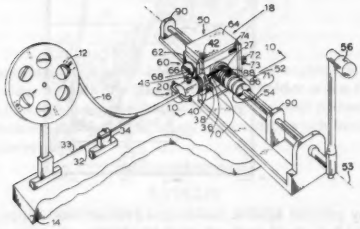
16. A welding machine which has work-supporting members that can hold and move a workpiece, a support for a welding torch that can hold said welding torch adjacent said workpiece while said workpiece is held and moved by said work-supporting members, driving members to move said work-supporting members and thereby provide movement of a predetermined surface of said workpiece relative to said welding torch, and support-moving members adapted to move said support for said welding torch relative to said work-supporting members, during the time said driving members are moving said workpiece relative to said welding torch, to vary the angular position of said welding torch relative to said

predetermined surface of said workpiece in a predetermined manner, whereby a weld can be formed at said predetermined surface of said workpiece without undercutting any portion of said workpiece, said support-moving members including a tiltable pivot mounting that pivotally holds said support for said welding torch, said tiltable pivot mounting being dynamically tiltable to tilt said suppport for said welding torch, and said support for said welding torch being dynamically pivotable relative to said tiltable pivot mounting, and said tiltable pivot mounting being shiftable sideways, whereby said support-moving members can dynamically provide universal movement of said support for said welding torch.

3,970,233
MACHINE AND A METHOD FOR FABRICATING A HELICOIDAL TUBE

Josef Suchecki, 4, Sussex Lane, Bethpage, N.Y. 11714

Filed Nov. 5, 1975, Ser. No. 628,889
Int. Cl.² A44C *27/00*; B21C *1/08*; B21D *5/10*
U.S. Cl. 228—17.5 **10 Claims**



1. A machine for fabricating a helicoidal tube from a longitudinal flat and bendable strip comprising:

a frame;

tube-forming means disposed on said frame for receiving the longitudinal flat strip and for the forming thereof into a tube having inner and outer dimensions and formed with a seam, said tube-forming means including:

a first element formed with a slit for receiving said strip;

a second element formed with a tapered opening and having widest and narrowest wall portions, said narrowest wall portion of said second element facing said slit, said widest wall portion of said second element having inner dimensions just exceeding the outer dimensions of said tube;

a holder for holding said first and second element in alignment so that said longitudinal strip is substantially centered with respect to the cross-section of said second element;

a hollow member interposed between said first and second elements;

a longitudinal guide member having a first longitudinal axis, clamped to said frame and passing through said first and second elements for guiding said strip around said guide member; and

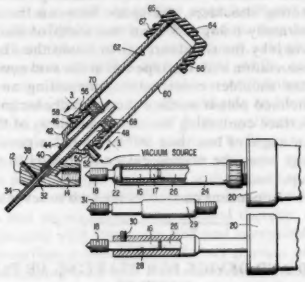
adjustment means disposed on said holder for adjusting the position of said second element with respect to said first element; and

helicoid-forming means disposed on said frame for receiving said tube and for the forming of the latter into a helicoid.

3,970,234
VACUUM DESOLDERING DEVICE FOR SOLDERING IRONS

Kenneth C. Litt, and William J. Siegel, both of Silver Spring, Md., assignors to Pace, Incorporated, Silver Spring, Md.

Filed Aug. 23, 1974, Ser. No. 499,997
Int. Cl.² B23K *37/00*
U.S. Cl. 228—20 **10 Claims**



1. Apparatus including a single desoldering device adaptable for use with a plurality of different soldering irons, each iron having a different recess for accomodating a removable soldering tip, said apparatus comprising:

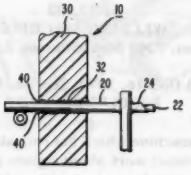
a. a plurality of adaptor means, each having a different and distinct fitting adapted to uniquely correspond to one of said plurality of different soldering irons so that each adaptor means is removably securable at one end thereof in the recess of its corresponding soldering iron, the other ends of all said adaptor means opposite said one ends thereof having the same configuration to permit the removable mounting thereon of said single desoldering device, one of said adaptor means being removably secured at said one end thereof in the recess of its corresponding soldering iron and its said other end outwardly extending therefrom; and

b. means comprising said single desoldering device for effecting desoldering removably mounted on the outwardly extending other end of said one adaptor means.

3,970,235
METHOD OF ANCHORING METALLIC COATED LEADS TO CERAMIC BODIES AND LEAD-CERAMIC BODIES FORMED THEREBY

Henry Leo Blust, Marion, Ind.; Norman Lee Lindburg, Berkeley Heights, and Dale Vernon Henry, Union, both of N.J., assignors to RCA Corporation, New York, N.Y.

Division of Ser. No. 468,098, May 8, 1974, Pat. No. 3,929,426.
This application Aug. 15, 1975, Ser. No. 605,121
Int. Cl.² B23K *1/04*
U.S. Cl. 228—122 **5 Claims**



1. A method of anchoring a metallic coated lead within an opening of slightly larger cross-sectional dimension in a fired ceramic body, wherein the lead includes a core material of a first metallic composition and an outer coating of a second

metallic composition, the melting temperature of which is lower than that of the said first metallic composition;

said first metallic composition being wettable by said second metallic composition and said ceramic body being substantially non-wettable by said second metallic composition; the opening of the ceramic body including interior surface irregularities; comprising the steps of:

a. inserting the lead in the opening of the ceramic body to form an interstitial opening at a lead-ceramic interface;

b. heating the lead and ceramic body as an integral assembly to a temperature above the melting temperature of the second metallic composition, but below the melting temperature of the first metallic composition and that of said ceramic body;

c. maintaining the temperature of the heating step (b) for a period of time sufficient to form a charge of molten second metallic material, and to cast, substantially by capillary action, said charge of molten second metallic material within said interstitial opening substantially conterminous with the interior surface irregularities of said opening; and

d. cooling said lead and ceramic body as an integral assembly below the melting temperature of said second metallic material whereby said lead is anchored within the opening of said ceramic body substantially by the casting action of said second metallic material within the interior surface irregularities of said opening.

3,970,236

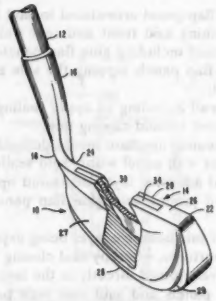
GOLF IRON MANUFACTURE

Kenneth A. Rogers, Van Nuys, Calif., assignor to Shamrock Golf Company, Los Angeles, Calif.

Filed June 6, 1974, Ser. No. 476,851

Int. Cl.² A63B *53/00*

U.S. Cl. 228—196 **12 Claims**



1. A method for the manufacture of a head of a golf club of the numbered catagory iron type having an improved weight distribution which comprises:

forming a head blank having a hosel, neck and body dependent thereof of the shape and size generally characteristic of an iron head of numbered category while providing an open cavity in the face of said body which cavity extends from at least the top edge of said body across a substantial portion of said face and to a first depth therein below the center of percussion;

forming faceplate land grooves along at least two opposite cavity edges to a second depth, less than the first depth therein;

preparing a sheet metal plate having a thickness approximately equal to said second depth and exterior dimensions to seat in said land grooves;

placing said metal plate in said grooves and thereby closing said face to said cavity;

fusing said sheet metal plate about its periphery to said head body, thereby forming a homogenous head blank having an interior cavity open along said edge surface and extending across a substantial distance of said face;

positioning a predetermined amount of high density weighted material in the bottom of said cavity below said center of percussion to impart the desired swing weight to said blank; and

filling said cavity with a low density filler.

3,970,237

METHOD OF BRAZING ALUMINUM PARTS

Kostas F. Dockus, Cicero, Ill., assignor to Borg-Warner Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 304,457, Nov. 7, 1972, abandoned. This application June 24, 1975, Ser. No. 589,992

Int. Cl.² B23K *35/28*

U.S. Cl. 228—208 **9 Claims**

1. The method of brazing an aluminum part to another metallic part with optimum fillet formation between the brazed parts wherein at least one part has a clad surface of brazing alloy, such as aluminum-silicon, thereon, or a filler material composed of a brazing alloy, such as aluminum-silicon, is used between the two parts, said brazing method comprising the steps of:

depositing on the clad surface or filler material a bond-promoting alloy selected from the group consisting of nickel-lead, cobalt-lead, or combinations of these metals in an amount of from about 0.3% to about 7% by weight of the total brazing alloy-bond-promoting alloy composition and wherein the thickness of said bond-promoting alloy is no greater than 2.5% of the brazing alloy-bond-promoting alloy thickness, and the lead content ranging from about 0.25% to 10 weight per cent of the total bond-promoting alloy content;

placing said parts in contact with each other, with or without pressure, in an inert atmosphere or vacuum and raising the temperature of the parts in said atmosphere or vacuum to between 1050° and 1150°F for a period long enough for melting and spreading of the brazing alloy.

3,970,238

SOLDERING OF STAINLESS STEELS

Lester Aronberg, Chicago, Ill., assignor to Lake Chemical Company, Chicago, Ill.

Continuation-in-part of Ser. No. 202,616, Nov. 26, 1971, abandoned, which is a continuation-in-part of Ser. No. 849,174, Aug. 11, 1969, Pat. No. 3,660,127. This application Jan. 31, 1973, Ser. No. 328,471

Int. Cl.² B23K *35/36*

U.S. Cl. 228—207 **8 Claims**

1. In a method for the soldering of stainless steel in the form of sheets or strips and in which a soft solder and a soldering flux are utilized, the improvement which comprises utilizing as said flux a composition which is in the form of a liquid containing added water and which consists essentially of at least one phosphorus-containing acid selected from the group consisting of phosphoric acid and phosphorous acid, and at least one phosphate salt selected from the group of monoammonium phosphate, diammonium phosphate, and amine mono- and di-phosphates in which the amine contains from 1 to 6 carbon atoms, said composition containing at least 50% of free phosphorus-containing acid, said phosphate salt being in solution in said liquid, said salt constituting, by weight, from about 10% to 50% of the phosphorus-containing acid.

3,970,239

FLUXING TECHNIQUE FOR REMOVING LEAD OXIDE

Michael Hill, Tarrytown, N.Y., assignor to General Instrument Corporation, Clifton, N.J.

Filed Aug. 14, 1975, Ser. No. 604,723
Int. Cl.² B23K 35/362
U.S. Cl. 228—220 8 Claims

1. A process for removing lead oxide from the surface of the lead solder of a semiconductor assembly in the inert atmosphere of a joining furnace comprising the step of:

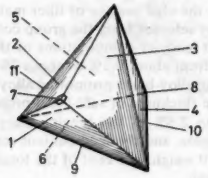
introducing into said joining furnace an acetate compound, said acetate compound being capable of reacting with said lead oxide at the temperature of said joining furnace to form at least one coordinated lead compound, said acetate compound and said coordinated lead compound both being gases at said joining furnace temperature.

3,970,240

CONTAINER FOR LIQUIDS

Oscar Jacques Van Leer, Amstelveen, Netherlands, assignor to Koninklijke Emballage Industrie Van Leer B.V., Amstelveen, Netherlands

Filed June 16, 1975, Ser. No. 587,053
Claims priority, application Netherlands, June 17, 1974, 7408072
Int. Cl.² B65D 5/02
U.S. Cl. 229—22 3 Claims



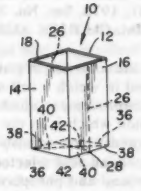
1. Container for liquids, such as pastes, powders, which container has the form of a spatial polygon, the sideplanes of which consisting of identical, in particular congruent triangles, characterized in that the container consists of six triangular planes which three by three meet with the top angles in two opposite points and placed with their bases against each other.

3,970,241

FLAT BOTTOM BAG

Violet M. Hanson, 14 Fairway Drive, Old Bethpage, N.Y. 11804

Division of Ser. No. 376,112, July 3, 1973, Pat. No. 3,916,770. This application July 31, 1975, Ser. No. 600,277
Int. Cl.² B65D 33/00
U.S. Cl. 229—58 9 Claims



1. As an article of manufacture,

a double-sealed flat bottom bag of heat sealable material comprising a seam heat sealing closed the bag bottom and defining opposite inwardly gusseted sides,

said inwardly gusseted sides being sealed to the bag bottom by said sealing seam for automatically forming flaps in overlying relationship with said closed bottom when the bag bottom is pressed flat,

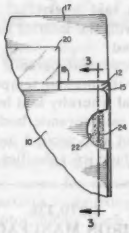
and said overlying flaps and closed bottom being heat sealed together in their flat overlying relationship by further sealing means extending across the width of the bag and said flaps.

3,970,242

HOSIERY ENVELOPE

Clifton S. Swafford; Thurman T. Caldwell, and William J. Dungan, all of Charlotte, N.C., assignors to Rexham Corporation, New York, N.Y.

Filed July 1, 1974, Ser. No. 484,659
Int. Cl.² B65D 27/14
U.S. Cl. 229—80 6 Claims



1. An improved envelope construction, comprising

a. juxtaposed parallel front and rear wall panels;

b. means joining said front and rear walls at bottom edges thereof;

c. a closing flap panel articulated to said front wall;

d. means joining said front and rear walls along the side edges thereof including glue flap panels;

e. said glue flap panels lapping the side edges of said rear wall panel;

f. said rear wall including an upper sealing zone adapted to be contacted by said closing flap;

g. a pair of sealing aperture means defined in the side edges of said rear wall panel within said sealing zone;

h. a bimodal adhesive layer deposited upon said glue flap panels and joining said glue flap panels with said rear panel;

i. portions of said adhesive layer being exposed through said sealing apertures, whereby said closing flap is adapted to be adhesively joined directly to the innermost one of said glue flap panels and said rear wall panel through said apertures to close said envelope.

3,970,243

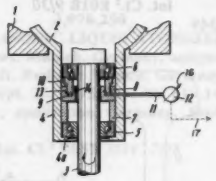
SUPPORT STRUCTURE FOR A SUSPENSION CENTRIFUGE

Volkmar Hentschel, Braunschweig, Germany, assignor to Braunschweigische Maschinenbauanstalt, Braunschweig, Germany

Filed July 15, 1975, Ser. No. 596,181
Claims priority, application Germany, July 25, 1974, 2435733
Int. Cl.² B04B 11/00
U.S. Cl. 233—19 R 9 Claims

1. A support structure for a suspension centrifuge comprising rotational shaft means for suspending said centrifuge, ball socket means, ball head means supported for pivotal movement in said ball socket means, shaft bearing means operatively supported by said ball head means, said shaft bearing means comprising axial bearing means and radial bearing means, said axial bearing means including an outer race and

an inner race, said bearing means further comprising support ring means held against axial displacement by said ball head means to surround with play said rotational shaft means, a ring groove in said support ring means facing toward said axial bearing means, ring piston means rigidly secured at one end thereof to said outer race of said axial bearing means, and



surrounding said rotational shaft means to reach with its other piston end into said ring groove, pressure fluid in said ring groove, pressure responsive actuating means, and conduit means operatively connecting said pressure responsive actuating means to said pressure fluid in said ring groove, whereby said pressure responsive actuating means may monitor the filling of said centrifuge.

3,970,244

CLEARING CENTRIFUGE

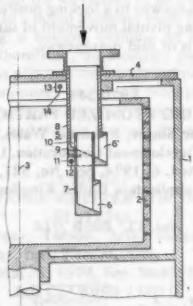
Albert Bucher, Kriens, Switzerland, assignor to Escher Wyss Limited, Zurich, Switzerland

Filed June 10, 1974, Ser. No. 477,970

Claims priority, application Switzerland, June 19, 1973, 8860/73

Int. Cl.² B04B *11/02*

U.S. Cl. 233—22 **12 Claims**



1. In a clearing centrifuge comprising a housing having a cover at one end, a centrifuge drum mounted for rotation in the housing, and an inlet tube for filling said drum with a material to be centrifuged; and wherein the inlet tube is mounted in said cover, extends into the drum in a direction parallel with the axis of drum rotation, and includes at least two outlet apertures which are directed radially with respect to said axis and deliver said material into the drum; the improvement that said inlet tube comprises two tubular part means which are formed to provide said outlet apertures and one of which is mounted at least partly within the other, the two tubular part means including means which seals the joint between them and being adjustable in at least one direction relatively to each other to permit changes in the orientation of at least one outlet aperture with respect to the drum.

3,970,245

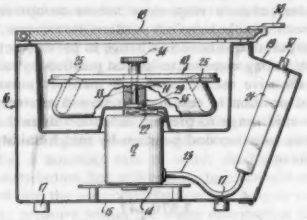
UNIVERSAL CENTRIFUGE

Hans-Peter Aeschlimann, Kurpfalzring, Switzerland, assignor to Dr. Molter GmbH, Heidelberg, Germany

Filed May 21, 1975, Ser. No. 579,349

Int. Cl.² B04B *9/10, 7/04*

U.S. Cl. 233—24 **6 Claims**



1. A centrifuge comprising a drive shaft, a rotation head detachably mounted on said shaft, drive means for rotating said shaft and said head mounted thereon at rotative speeds ranging from low speeds to high speeds, and control means for regulating the rotative speed of said drive means, said control means comprising means for pre-selecting both the rotative speed and the cycling time of said head, means for sensing the rotative speed of said head and timing means activated by said sensing means for timing the rotation cycle of said head when said head reaches the pre-selected rotative speed.

3,970,246

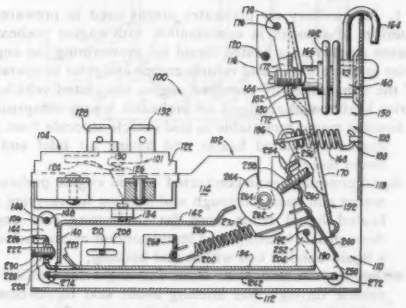
AIR CONDITIONING CONTROL SYSTEM

Russell G. Attridge, Jr., and Andrew Kulick, both of Columbus, Ohio, assignors to Ranco Incorporated, Columbus, Ohio

Division of Ser. No. 438,755, Feb. 1, 1974, Pat. No. 3,915,376. This application Aug. 19, 1975, Ser. No. 605,908

Int. Cl.² G05D *22/00*

U.S. Cl. 236—44 C **9 Claims**



1. A control device responsive to ambient air temperature and moisture content levels comprising:

a. a control unit operable between first and second control conditions;

b. an operating member for said control unit, said operating member supported for movement between first and second positions in which said control unit is in said first and second conditions, respectively;

c. relative humidity responsive means for moving said operating member and comprising an elongated humidity sensing element comprised of a material which changes length in response to changes in relative humidity of air ambient said element and supporting structure for said element;

d. air temperature responsive means cooperating with said relative humidity responsive means to prevent actuation of said operating member in response to changes in abmient air relative humidity occurring as a result of air temperature changes within a given range, said operating member being moved substantially only in response to sensed changes in moisture content of the air in said temperature range; and,

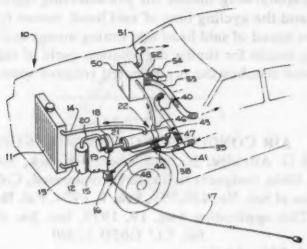
e. said temperature responsive means comprising a link member movable to a first position in response to sensed air temperatuers above said range to prevent actuation of said operating member to its first position by said humidity responsive means, said link member movable to a second position in response to sensed air temperatures below said range to prevent actuation of said operating member to its second position by said humidity responsive means.

3,970,247

CONSERVATION OF ENERGY HEATER

Boyd E. Keeling, P.O. Box 4-1059, Anchorage, Alaska 99509, and Harold R. Hawkins, 6675 Holly Lane, Anchorage, Alaska 99502

Filed Nov. 7, 1974, Ser. No. 521,555
Int. Cl.² B60H 1/02
U.S. Cl. 237—12.3 B 4 Claims



1. An auxiliary air preheater means used in prewarming interiors of vehicles in combination with engine preheating means employing a heated liquid for prewarming the engine prior to operation of said vehicle engine and prior to operation of the conventionally provided engine associated vehicle interior heater, said auxiliary air preheater means comprising:

housing means mountable to said vehicle separate from said engine associated heater and having air inlet and air outlet means;

liquid conduit means connected to said engine preheating means and passed through said housing for carrying said heated liquid being used for preheating said engine through said housing, said liquid conduit means including a liquid conduit coil within said housing;

means for circulating air from within the interior of said vehicle through said housing about said liquid conduit coil including an air inlet conduit connected between the vehicle interior and said housing inlet means and an air conduit outlet means connecting between said vehicle interior and said housing outlet means; and

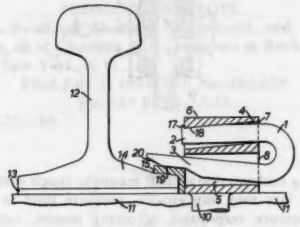
air blower means associated with said housing for drawing vehicle interior air through said air inlet conduit into said housing through said housing inlet means, for moving said air through said housing in contact with said liquid conduit coil in heat exchange relation to heat said air and then blowing said heated air out said housing outlet means through said air outlet conduit into said vehicle interior, whereby vehicle interior air is constantly recirculated through the housing of said auxiliary air preheater means independently of operation of the vehicle engine and independently of operation of the conventional engine associated vehicle heater.

3,970,248

COMBINED RAIL CLIP AND ANCHORAGE

George Molyneux, Eastbrook Road, Gloucester, England

Continuation-in-part of Ser. No. 396,303, Sept. 11, 1973, abandoned. This application Oct. 24, 1974, Ser. No. 517,605
Claims priority, application United Kingdom, Sept. 12, 1972, 42287/72
Int. Cl.² E01B 9/30
U.S. Cl. 238—349 23 Claims



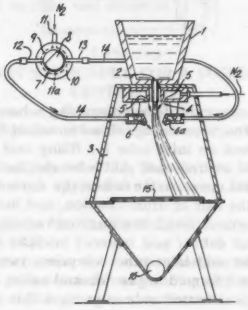
1. A combination of a rail clip and anchorage for holding down a flanged track rail onto a supporting surface, wherein said rail clip comprises a substantially U-shaped bar of resilient yet sturdy material providing two arms and said anchorage is provided with mounting means whereby it may be secured to said supporting surface and is formed to define a passageway to receive one arm of said bar and engaging both top and bottom surfaces of said arm at spaced positions in such a way that said one arm is restrained against tilting movement and both said arms will be directed towards said rail flange, such that a bearing surface of the other arm of said bar, situated below the one arm, will be caused to bear down onto the flange of said track rail, cooperating locking means being provided between said anchorage and said rail clip to resist withdrawal of said clip when said one arm of said bar is inserted into said passageway to a locking position and including means for restraining pivotal movement of said rail clip about the longitudinal axis of said passageway.

3,970,249

SPRAYING ATOMIZED PARTICLES

Alfred Richard Eric Singer, Swansea, Wales, assignor to National Research Development Corporation, London, England

Filed Nov. 6, 1974, Ser. No. 521,403
Claims priority, application United Kingdom, Nov. 6, 1973, 51437/73
Int. Cl.² B05B 3/14
U.S. Cl. 239—102 14 Claims



1. Apparatus for the spraying of atomised particles, which comprises means for producing a coherent stream of gas

atomised particles, means for directing a secondary stream of gas against the stream of gas atomised particles and control means adapted for repeated cyclic operation for varying the flow of the secondary stream of gas in such a manner as, in operation, to deflect the stream of gas atomised particles and impart thereto an oscillation substantially in a single plane.

3,970,250

ULTRASONIC LIQUID ATOMIZER

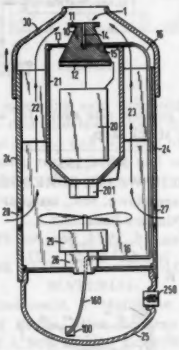
Wolf-Dietrich Drews, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Sept. 24, 1975, Ser. No. 616,147

Claims priority, application Germany, Sept. 25, 1974, 2445791

Int. Cl.² B05B *3/14, 7/28*

U.S. Cl. 239—102 **11 Claims**



1. An ultrasonic liquid atomizer utilizing a piezoelectric vibratory system with the vibrations of an piezoelectric transducer transmitted to a liquid atomizer plate by a conical transformer comprising: a housing defining an air flow chamber having an outlet therefrom, an atomizer plate positioned in said housing means adjacent the outlet defining an air flow jet area around the atomizer plate and through the outlet and blower means inducing an air flow through the housing past the atomizer plate and thence through the outlet.

3,970,251

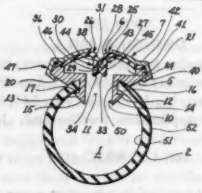
PIPE INSERTABLE EMITTER FOR IRRIGATION SYSTEMS

Richard C. Harmony, Tucson, Ariz., assignor to Harmony Emitter Company, Inc., Tucson, Ariz.

Filed Mar. 6, 1975, Ser. No. 555,945

Int. Cl.² B05B *15/02*

U.S. Cl. 239—107 **9 Claims**



1. An emitter insertable within a water distribution line for discharging water from the water distribution line at a constant rate despite changes in water pressure within the water distribution line, said emitter comprising:

a. a base for conveying water from within the water distribution line and through the wall of the water distribution line, said base having a depending hollow shroud for penetrating the wall of the water distribution line and conveying water therefrom;

b. an apertured diaphragm mounted upon said base for establishing a water discharge outlet from said emitter;

c. bias means for maintaining a constant rate of water flow through said water discharge outlet despite variations in water pressure within said shroud, said bias means comprising a pair of opposed surfaces separable from one another for defining a single passageway for the water flow; and

d. a cap for securing said diaphragm to said base, said cap including a slot disposed in proximity to said outlet for accommodating the discharge of water from said emitter; whereby, a constant rate of water discharge from the water distribution line will occur wherever said emitter is inserted into the water distribution line despite variations in water pressure within the water distribution line.

3,970,252

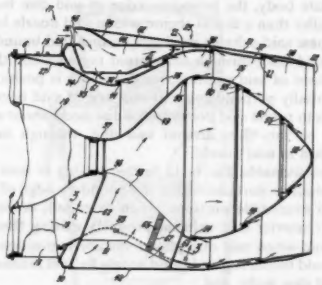
COOLED EXHAUST DUCT

Charles H. Smale, Indianapolis, Ind., and James A. Pyne, Jr., Phoenix, Ariz., assignors to General Motors Corporation, Detroit, Mich.

Filed Sept. 28, 1967, Ser. No. 672,678

Int. Cl.² B64D *33/04*

U.S. Cl. 239—127.3 **6 Claims**



1. A film cooled gas turbine exhaust duct comprising, in combination,

an outer body,

a bulbous hollow inner inner body,

the bodies defining between them an exhaust duct for hot gas,

the inner body comprising a plural number of radially spaced telescoped sections defining gaps spaced axially of the exhaust duct for flow of cooling gas between the sections,

the gaps extending circumferentially of the exhaust duct and opening in the direction of flow through the exhaust duct so as to provide a film of cooling gas over the surface of the inner body,

ribs disposed circumferentially of the inside of the inner body adjacent the gaps so as to block direct transmission of radiation from within the inner body through the gaps,

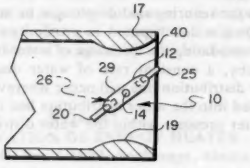
and means for supplying a cooling gas into the inner body.

3,970,253

FLOW AREA MODULATOR AND FLOW DEFLECTOR

William M. Burkes, and William H. Miller, both of McGregor, Tex., assignors to Rockwell International Corporation, El Segundo, Calif.

Division of Ser. No. 395,807, Sept. 10, 1973, abandoned. This application June 16, 1975, Ser. No. 587,022
Int. Cl.² B63H *11/10;* B64C *15/06;* F16K *1/228*
U.S. Cl. 239—265.19 2 Claims



1. A butterfly type flow area modulator and flow deflector for restriction and deflection of rocket engine exhaust products exiting a rocket engine nozzle comprising:

a rocket engine nozzle body;

a positionable disc body having a hinge pin therethrough so as to place said disc body perpendicular to the axis of said nozzle body, the boundary edge of said disc body being smaller than a throat region within said nozzle body so as to pass said exhaust products around said boundary edge of said disc, through said throat region when the planar surface of said positionable disc body is positioned substantially perpendicular to said axis of said nozzle;

means to rotate said positionable disc body about said hinge pin to vary flow around said disc, through said throat region in said nozzle;

said positionable disc body further having at least a pair of extendible portions within the boundary edge of said disc, said extendible portions, when extended, serving to further restrict said exhaust products exiting through said throat when said disc planar surface is positioned askew of said throat region in said nozzle by said means to rotate said disc body; and

actuating means to extend or retract said extendible portions to provide a finite variable control of said rocket engine exhaust products passing around the peripheral edge of said disc, through said throat in said rocket engine nozzle body.

3,970,254

METHOD FOR SEPARATING GLASS FROM HEAT RESISTANT MATERIALS

Paul G. Marsh, Hamilton, Ohio, assignor to Black Clawson Fibreclaim, Inc., Middletown, Ohio

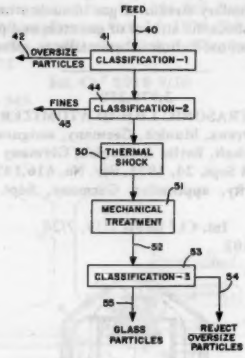
Filed Aug. 19, 1974, Ser. No. 498,850
Int. Cl.² B02C *19/12*
U.S. Cl. 241—1 13 Claims

1. A method of recovering glass from a loose mixture of separate particles of glass and of heat resistant materials including metal, stone and ceramic materials, comprising:

a. thermally shocking the mixture by rapidly increasing or decreasing its temperature over a sufficiently wide range to shatter the glass,

b. classifying said thermally shocked mixture to obtain a fine fraction consisting essentially of said shattered glass particles and a coarse fraction consisting of said heat resistant materials, and

c. said method also including the step of establishing a



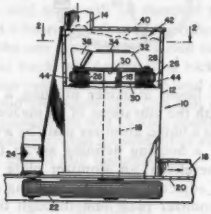
predetermined particle size range for said mixture prior to said thermal shock step.

3,970,255

SOLID WASTE SHREDDER

Harry C. Foster, Hagerstown, Md., assignor to The Carborundum Company, Niagara Falls, N.Y.

Filed Aug. 15, 1974, Ser. No. 497,590
Int. Cl.² B02C *13/18*
U.S. Cl. 241—186 R 6 Claims



1. A solid waste shredder comprising a casing having an inlet adjacent a top thereof and an outlet adjacent a bottom thereof for passage of solid waste into and through said casing, shredding means disposed within said casing for shredding said solid waste as it passes therethrough, and inducer means associated with said casing for impelling said solid waste downwardly toward said outlet, said induce means being comprised of vane means and motor means for rotating said vane means for creating a pressure head which impels said solid waste toward said outlet.

3,970,256

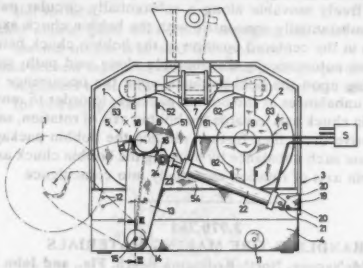
GRINDING MILL

Edgar Rüegger, Arnegg, and Stefan Meister, St. Gallen, both of Switzerland, assignors to Buhler AG, Uzwill, Switzerland

Filed Jan. 16, 1975, Ser. No. 541,408
Claims priority, application Switzerland, Jan. 18, 1974, 688/74
Int. Cl.² B02C *4/34*
U.S. Cl. 241—231 26 Claims

1. A grinding mill, comprising support means; grinding rolls each having opposite axial ends provided with respective trunnions; open-and-shut journals for the respective trunnions; displacing means engageable with the trunnions of each grinding roll and pivotable between a first end position in which the trunnions of a respective grinding roll are located in their associated journals, and a second end position in

which the grinding roll and the trunnions thereof are laterally displaced relative to said first position and supported by said displacing means, said displacing means comprising a pair of levers each having a first end portion, and a second end portion provided with a receiver for a respective trunnion, and



mounting means mounting said first end portions on said support means so that said levers have freedom of pivoting movement for said second end portions to move to said first and second positions, respectively; and adjusting means for adjusting the position of a respective trunnion within the associated receiver.

3,970,257

APPARATUS FOR REDUCING THE SIZE OF DISCRETE MATERIAL

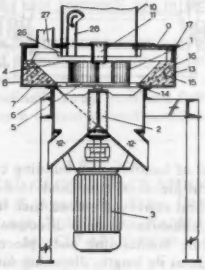
George James MacDonald, 8 Mathieson Ave., Khandallah, Wellington, and Bryan Allen Bartley, 625 Mount Eden Road, Auckland 3, both of New Zealand

Filed Oct. 2, 1973, Ser. No. 402,680

Claims priority, application New Zealand, Oct. 5, 1972, 168612

Int. Cl.² B02C *1/10*

U.S. Cl. 241—275 4 Claims



1. A centrifugal disintegrator for reducing the particle size of disintegratable material, said disintegrator comprising a housing symmetrical about a vertical axis said housing including a floor with vertical walls rising therefrom, a centrally located opening defined by said floor, a rotor with a vertical axis rotatably supported within said housing with the lower surface of said rotor being positioned within and substantially coplanar with said floor so that an annular opening is defined between the rotor and the floor, means for rotating said rotor about its axis, a material feed means above said rotor for supplying material axially to said rotor for acceleration and discharge from the periphery thereof, said floor in use supporting a bank of disintegratable material against the wall of said housing so that further material accelerated from the rotor is disintegrated against the bank of material prior to falling through the annular opening between the rotor and the floor,

said rotor in turn comprising upper and lower discs with the upper disc defining a central opening to receive material to be disintegrated, a peripheral wall between said discs, said peripheral wall having openings through which said material accelerated by said rotor is thrown and nonradial vertical walls defining, in combination with said discs, passageways shaped to retain in use on the advancing surfaces of the walls thereof a continuous layer of material to be reduced with further material to be reduced advanced from near the axis to the periphery of the rotor over retained material;

and wherein said non-radial vertical walls each comprise a tip blade adjacent the periphery of said rotor and having a hardened tip at the leading edge thereof, a main blade extending from the tip blade to a position where a line normal to the main blade passes adjacent the center of the rotor, and a trail blade extending beyond the inner end of the main blade for a distance sufficient to prevent wear.

3,970,258

MINCING MACHINE

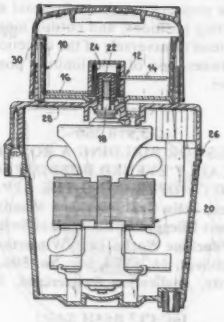
Jean Mantelet, Paris, France, assignor to Moulinex, Societe Anonyme, Bagnolet, France

Filed July 29, 1975, Ser. No. 600,184

Claims priority, application France, Oct. 1, 1974, 74.32977

Int. Cl.² B02C *18/12*

U.S. Cl. 241—282.1 4 Claims

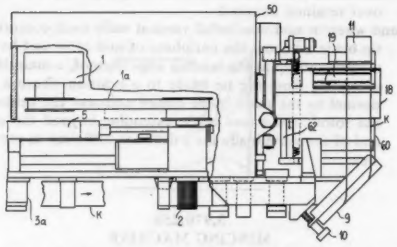


1. An electrically driven domestic appliance comprising a rotatable tool mounted on the top end of a vertical motor-driven shaft by a detachable coupling device comprising a driving element rigidly fastened to the shaft and engageable in a sleeve rigidly fastened to the tool, the driving element and sleeve being provided respectively on the exterior and the interior thereof with complementary helical driving ramps which wind from bottom to top of said element and sleeve in the direction of rotation of the driving element and have active surfaces engageable one with the other during driving of the tool, and said driving element and sleeve being additionally provided respectively on the exterior and interior thereof with complementary helical retaining ramps which wind from bottom to top of said element and sleeve in the opposite direction to the direction of rotation of the driving element and have active surfaces engageable one with the other when the driving element stops rotating, the active surface of each driving element ramp facing downwards and the active surface of each sleeve ramp facing upwards.

3,970,259
DEVICE FOR APPLYING ADHESIVE TAPE TO A WIRE COIL

Hans Schmid, Ruschlikon, Switzerland, assignor to Meteor AG, Ruschlikon, Switzerland

Filed Apr. 16, 1975, Ser. No. 568,658
Claims priority, application Switzerland, Apr. 23, 1974, 5531/74
Int. Cl.² H01F 11/04
U.S. Cl. 242—7.08 **8 Claims**

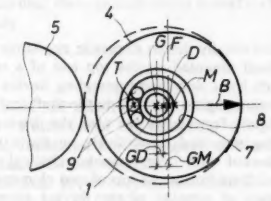


1. Device for applying adhesive tape to a wire coil comprising a support movable between an inoperative and an operative position; a pressure member on the support for urging adhesive tape against a wire coil in the operative position of the support; a slide slidable on the support between two limiting positions in a direction transverse to the direction of movement of the support; means on the slide for pulling adhesive tape towards the pressure member when said slide moves into one of said limiting positions; and cutting means movable on a path which extend transversely of the direction of movement of the slide between one of said limiting positions and said pressure member.

3,970,260
APPARATUS FOR BUILDING A ROTATIONALLY SYMMETRICALLY EVENED BOBBIN PACKAGE AND METHOD OF OPERATING THE APPARATUS

Klaus Bruggisser; Felix Graf; Gerhard Mandl, all of Winterthur, and Albert Rüegg, Pfaffikon, all of Switzerland, assignors to Rieter Machine Works, Ltd., Winterthur, Switzerland

Filed Sept. 16, 1974, Ser. No. 506,092
Claims priority, application Switzerland, Sept. 26, 1973, 13798/73
Int. Cl.² B65H 54/42
U.S. Cl. 242—18 DD **17 Claims**

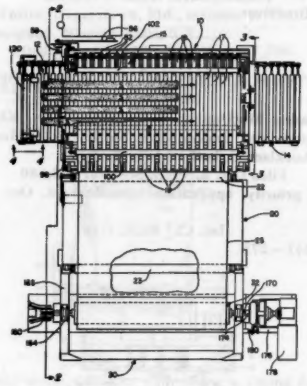


1. An apparatus for building a substantially rotationally symmetrically evened bobbin package with a bobbin chuck having a bobbin chuck axis and serving for supporting the bobbin and with a friction drive drum for driving the bobbin about an axis of rotation, the improvement comprising: said bobbin chuck being rotatable at speeds above a critical rotational speed, said bobbin chuck assuming a centered position when said bobbin chuck axis and said bobbin axis of rotation essentially coincide, a balancing element provided on the bobbin chuck, said balancing element serving for enabling the correction of incipient unbalances of the bobbin package which shifts the bobbin chuck axis away from the bobbin axis of rotation and out of the centered position of the bobbin chuck, said balancing element being equipped with a mass which is freely movable along a substantially circular path which is substantially concentric with the bobbin chuck axis, said mass in the centered position of the bobbin chuck being evenly and automatically distributable along said path, said mass acting upon the bobbin chuck upon the occurrence of incipient unbalances at the bobbin package, in order to move the bobbin chuck axis towards the bobbin axis of rotation, said friction drive drum then further winding the bobbin package to eliminate such unbalance by bringing the bobbin chuck axis and bobbin axis of rotation essentially into coincidence.

3,970,261
HANDLING TIRE MAKING MATERIALS

William McNenney, North Redington Beach, Fla., and John R. Sponseller, North Cantor, Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Sept. 29, 1975, Ser. No. 617,909
Int. Cl.² B65H 75/02
U.S. Cl. 242—55 **7 Claims**



1. The method of handling tire building components comprising moving cut pieces of gum stock in a direction parallel their lengths on first conveyor means, then lifting and moving said pieces perpendicular to said direction on second conveyor means while maintaining each piece parallel to said direction throughout its length, disposing said pieces seriatim on a winding cloth and winding said cloth and said pieces together about a core while maintaining said pieces parallel to each other and to said core.

3,970,262
QUICK-RELEASE HUB

Ralph A. Brown, and Wilford W. Snow, both of Bountiful, Utah, assignors to Sperry Rand Corporation, New York, N.Y.

Filed May 27, 1975, Ser. No. 581,013
Int. Cl.² B65H 17/02
U.S. Cl. 242—68.3 **5 Claims**

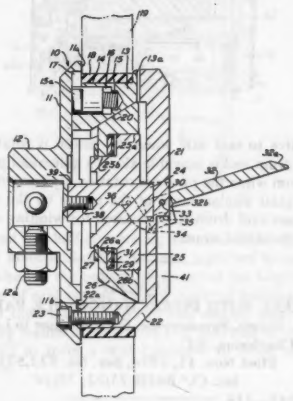
1. A hub for mounting a reel, comprising in combination:
a first circular plate,
a plurality of arcuate shaped segments forming a circumferential surface,

an elastic band disposed around said circumferential surface for biasing said segments in an inwardly radial direction,

second means having a first position holding said segments in a radially outward extended position against the bias of said elastic band securing a reel about said circumferential surface,

said elastic band frictionally engaging the reel when said second means is in said first position,

said second means having a second position permitting said segments to be moved radially inward by said elastic band for releasing said reel,



third means connected to said second means for selectively moving said second means between said first and second positions,

each of said segments comprising a lip engaging said reel between said lips and said first plate when said segments are in said radially outward extended position and disengaging said reel to permit said reel to be removed from the hub when said segments are in the radially inward position,

said first means further comprising a spring laoded pin for each of said segments normally biasing said segments away from said plate causing each of said segments to move longitudinally away from said first plate when said second means is in said second position.

3,970,263

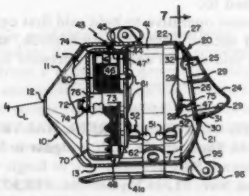
RUGGEDIZED CLOSED FACE SPINNING REEL

R. Dell Hull, 6101 E. Apache St., Tulsa, Okla. 74101

Filed Apr. 7, 1975, Ser. No. 565,407

Int. Cl.² A01K *89/00*

U.S. Cl. 242—84.2 A **6 Claims**



1. A ruggedized closed face spinning reel including a reel frame, a line spool supported on said frame, a main shaft extending axially through the center of said frame and mounted for limited axial movement therein between predetermined line casting and line retrieval positions, a crank drive mechanism mounted in said reel frame for rotating said main shaft, a rearwardly facing spinnerhead of predetermined diameter having a rearwardly facing notched peripheral edge and carried by the forward end of said main shaft, front and rear cover means closing off the front and rear faces of said reel frame, characterized in that

a. said reel frame is of all metal construction and includes a cylindrical body member having a transverse circular wall;

b. an inner annular ring having a diameter less than said predetermined spinnerhead diameter and including a radially inwardly extending circular flange connected to the front face of said circular wall;

c. an outer annular ring having rearwardly disposed portions of a diameter not substantially greater than the diameter of said inner annular ring is secured to said inner annular ring by a force fit connection;

d. the forwardmost peripheral portions of said outer ring are outwardly flared to a diameter greater than that of said spinnerhead;

e. said flared peripheral portions and said inner ring thereby cooperating to define an annular groove adapted to receive said notched spinnerhead when said main shaft is in said line retrieval position.

3,970,264

REEL FOR STORING AN ELONGATED PLIABLE MEMBER

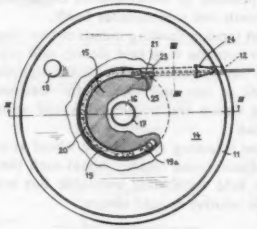
Henning Fredriksson, Angsgatan 24 B, and Sven Åke Helde, Dalvindsgatan 3, both of Kungsbacka, Sweden

Filed Apr. 22, 1975, Ser. No. 570,370

Claims priority, application Sweden, Apr. 24, 1974, 7405479

Int. Cl.² B65H *75/40*

U.S. Cl. 242—96 **4 Claims**



1. In a reel for storing an elongated, pliable member and including a bowl shaped main portion provided with a bottom, a side wall having an internal cylindrical face extending therefrom, a passage opening in said side wall, and a cover for mounting on and closing the main portion provided with a centrally located spigot having a cylindrical body, said spigot body extending towards the bottom of the main portion when said cover is in mounted position on said main portion and defining with said cylindrical face an annular space for storing said pliable member, the improvement comprising said spigot defining a first groove internally thereof for the reception of one end of the pliable member, said first groove communicating with said annular space through an opening defined in the outer wall of said spigot body and extending from said opening peripherally along said spigot wall over an angle of at least 180°but not exceeding 360°, and a mark coinciding with said opening in the face of the cover which is outwardly turned when said cover is mounted on said body portion.

3,970,265

SAFETY BELT WINDING DEVICE

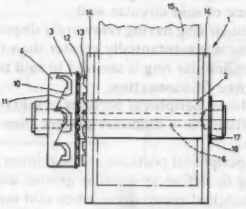
Wilfried Köpke, Sulfeld, and Günter Hoffmann, Gifhorn, both of Germany, assignors to Volkswagenwerk Aktiengesellschaft, Wolfsburg, Germany

Filed Mar. 6, 1975, Ser. No. 556,093

Claims priority, application Germany, Apr. 25, 1974, 2419937

Int. Cl.² A62B 35/02

U.S. Cl. 242—107.4 A 3 Claims



1. A winding device for a vehicle safety belt comprising, in combination:

a. a housing;

b. a sleeve for supporting a wound-up safety belt, said sleeve being retained for rotation within said housing and being spring-biased in a direction tending to wind the safety belt;

c. a ratchet wheel arranged at one end of said sleeve and having ratchet teeth disposed thereon coaxially with said sleeve;

d. counter teeth disposed on said housing coaxially with said sleeve; a catch wheel arranged between said ratchet wheel and said housing and having catch teeth disposed for selective engagement with said ratchet teeth and said counter teeth, said catch wheel being displaceable into a locking position of simultaneous engagement with said ratchet teeth and said counter teeth;

f. safety belt tension limiting means connecting said ratchet wheel for rotation with said sleeve, said means including a torsion bar extending coaxially through said sleeve and connected at one end thereof for torsional movement with said sleeve and at the other end with said ratchet wheel; and

g. means for retaining said ratchet wheel at an end of said sleeve adjacent said ratchet wheel such that said ratchet wheel is held torsionally rotatable but not axially displaceable relative to said sleeve.

3,970,266

DEVICE FOR WINDING A SEAT BELT IN VEHICLES

Bernard J. Doin; Bernard E. Plantif, both of Saint Medard en Jalles, and Jean-Francois Tillac, Bordeaux Cauderan, all of France, assignors to Societe Nationale des Poudres et Explosifs, France

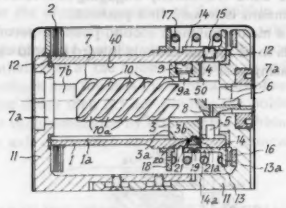
Filed Apr. 3, 1975, Ser. No. 564,730

Claims priority, application France, Apr. 25, 1974, 74.14504

Int. Cl.² B65H 75.48

U.S. Cl. 242—107.4 R 11 Claims

1. A device for winding up an elongate flexible element, such as a vehicle safety belt, comprising a casing, an axle mounted in said casing and rotationally fast therewith, a hollow winding-drum rotatably mounted in said casing coaxial with and surrounding said axle, an annular piston positioned between said drum and axle and axially movable relative thereto between initial and final positions, an annular pressure chamber defined within said drum by said piston in said initial position thereof, a pyrotechnic charge for pressurising said pressure chamber with combustion gases therefrom to propel said piston axially along said drum and axle from said initial position, to said final position, first cooperable guide means on said piston and said drum, and second cooperable guide means on said piston and said axle, said first and second guide means being so arranged that said piston is rotationally fast with said drum or said axle and is movable along a helicoidal



path relative to said axle when the piston is rotationally fast with said drum and is movable along a helicoidal path relative to said drum when the piston is rotationally fast with said axle, whereby axial displacement of the piston by the combustion gases causes said drum to be rotated for winding said flexible element on to said drum.

3,970,267

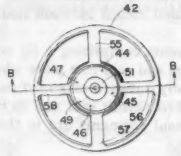
REEL WITH INTERCHANGEABLE PARTS

George A. Sheetz, Summerville, S.C., assignor to Larry Harold Kline, Charleston, S.C.

Filed Nov. 11, 1974, Ser. No. 522,573

Int. Cl.² B65H 75/22, 75/14

U.S. Cl. 242—115 21 Claims



1. A reel for storing cabled material comprising:

a. a first central section piece;

b. a second central section piece which may be pressed against, but is not mechanically fastened to, said first central section piece to form a center portion with two ends;

c. a first end piece to which one of said two ends of said center portion may be pressed, but is not mechanically fastened to;

d. a second end piece to which the other of said two ends of said center portion may be pressed, but is not mechanically fastened to;

e. holding means operative to hold said first central section piece, said second central section piece, said first end piece, and said second end piece, pressed together.

3,970,268

REEL COMPRISING REEL HALVES

George A. Sheetz, Summerville, S.C., assignor to Larry Harold Kline, Charleston, S.C.

Filed Nov. 11, 1974, Ser. No. 522,572

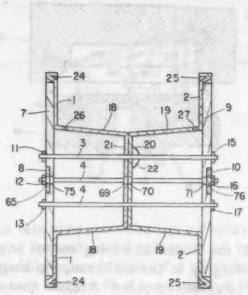
Int. Cl.² B65H 75/22, 75/14

U.S. Cl. 242—115 20 Claims

1. A reel for storing cabled material comprising:

a. a first reel half comprising a first disk; a first cabled material holding section, attached to said first disk,

wherein the outside diameter of the larger diameter portion of said first cabled material holding section is smaller than the diameter of said first disk, and wherein said first cabled material holding section has the shape of the frustum of a first cone with a larger diameter edge and a smaller diameter edge with said larger diameter edge of said frustum of a first cone attached to said first disk;



b. a second reel half comprising a second disk; and a second cabled material holding section, attached to said second disk, wherein the outside diameter of the larger diameter portion of said second cabled material holding section is smaller than the diameter of said second disk;

c. securing means holding said first reel half to said second reel half to form a reel operative to store said cabled material.

3,970,269

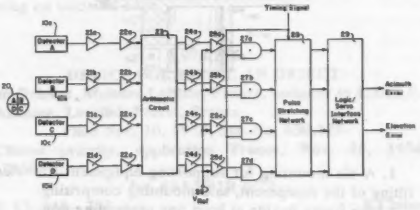
ARITHMATIC CIRCUIT FOR BANG-BANG SEEKERS

Robert F. Conforti, Thousand Oaks, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Jan. 6, 1975, Ser. No. 538,841

Int. Cl.² F41G 7/00

U.S. Cl. 244—3.16 **2 Claims**



1. A missile guidance system comprising:

detector means having n detecting sections for receiving a signal from a target and generating output signals from any of said sections in response to said target signal;

arithmatic means coupled to said detector means said arithmatic means having *n* channels corresponding to said detector means sections, said arithmatic means for summing a signal of any channel with the average of signals on said other *n*-1 channels and providing an output signal from said channel having a signal greater than the average of said other signals; and

command generating means coupled to said arithmatic means for providing output signals to steer said missile to said target in response to said arithmatic means.

3,970,270

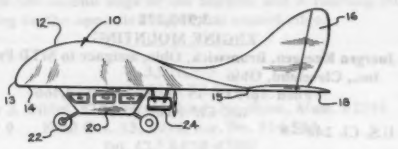
LOW SPEED AIRCRAFT

Rene E. Pittet, Jr., 537 N. Gordon St., Marshall, Mich. 49068

Filed Nov. 11, 1974, Ser. No. 522,606

Int. Cl.² B64B 1/08

U.S. Cl. 244—5 **4 Claims**



1. A low speed aircraft comprising, in combination, a gas envelope having an airfoil configuration including a leading edge and a trailing edge, said envelope having a geometrical vertical central axis, said envelope being defined by a plurality of interconnected pie-shaped segments each having lateral sides and an apex, trusses defining said segments lateral sides, means interconnecting adjacent trusses of adjacent segments together to define said envelope whereby said segment apexes are located adjacent said central axis, said segments each including a gas bag disposed between the associated trusses, a lighter-than-air gas within said gas bags, control surfaces affixed to said envelope, a passenger compartment mounted on said envelope, and motor means mounted on said envelope for propelling said envelope in the direction of said leading edge.

3,970,271

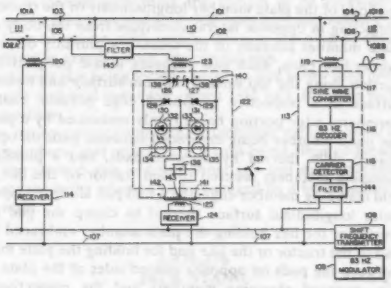
DUAL FREQUENCY TRACK CIRCUIT

John H. Auer, Fairport, N.Y., and Willis R. Smith, Johannesburg, South Africa, assignors to General Signal Corporation, Rochester, N.Y.

Filed Mar. 27, 1975, Ser. No. 562,725

Int. Cl.² B61L 21/06

U.S. Cl. 246—34 R **36 Claims**



1. A double rail track circuit for a railroad block system comprising in combination:

a. first and second adjacent blocks of said block system with each rail of said first block insulated from the corresponding rail of said second block by isolating joints;

b. a transmission line having terminals accessible at said first and second blocks for providing a reference signal which is transmitted by said transmission line as a modulated carrier signal;

c. first and second means for coupling said reference signal from said transmission line to the rails of said first and second blocks, respectively, with the coupling to said first block being near said isolating joints and with the coupling to said second block being at its end remote from said isolating joints and with approximately 180° phase difference therebetween; and

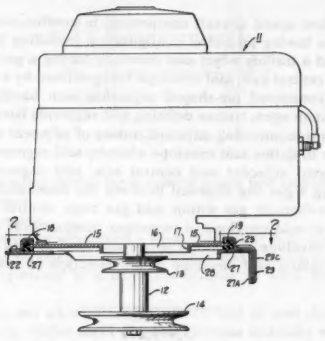
d. comparing means coupled between said transmission line and the rails of said second block near said isolating joints for comparing the phase relationship of the rail signal thereat with the phase of the reference signal on said transmission line, and to provide a signal indicative of the phase relationship.

3,970,272

ENGINE MOUNTING

Juergen Kaesgen, Brunswick, Ohio, assignor to MTD Products Inc., Cleveland, Ohio

Filed Apr. 18, 1975, Ser. No. 569,466
Int. Cl.² F16F *15/00*
U.S. Cl. 248—9 **9 Claims**



6. Mounting means for use in mounting an engine to a tractor or the like to minimize transmission of vibration therebetween, comprising a rigid plate member adapted to have a said engine secured thereto, said plate member having peripheral edge portions disposed along opposite spaced sides thereof longitudinally and laterally of said tractor, said peripheral edge portions projecting forwardly and rearwardly from the body of the plate member longitudinally of the tractor and projecting in opposite lateral directions from the body of the plate member laterally of the tractor, a plurality of resilient rubber-like pads, each pad engaging a said peripheral edge portion along the top surface, bottom surface and outer edge surface of a respective peripheral edge portion, each said peripheral edge portion being firmly embraced by a pad and the plate member being embraced between pads on opposed spaced sides thereof by opposed pads, and a plurality of clamping members secured to said tractor or the like, each said clamping member engaging a said pad along its upper and outer longitudinal surface thereof to clamp the pad to the tractor or the like holding the plate member embraced by the pad to the tractor or the like and for holding the plate member between the pads on opposite spaced sides of the plate member, opposed clamping members and the respective pads clamped thereby being disposed to firmly hold the plate member therebetween against longitudinal and lateral movement relative to said tractor, whereby the plate member is isolated from the tractor or the like and from said clamping member by said pads.

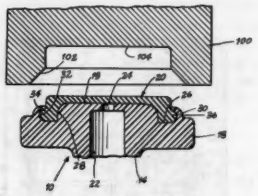
3,970,273

APPLIANCE FOOT WITH SECURE RESILIENT PAD

Jimmy D. Tanner, Des Peres, Mo., assignor to Arundale, Inc., St. Louis, Mo.

Filed Jan. 10, 1975, Ser. No. 540,117
Int. Cl.² F16F *15/00*; B29C *19/00*
U.S. Cl. 248—24 **10 Claims**

1. A unitary molded appliance foot of relatively rigid material having a weight bearing face, a longitudinal portion extending outwardly from adjacent the weight bearing face and a resilient pad on the face, the face having a relieved portion, the relieved portion of the face having an undercut, the resilient pad having a dependent rim with an outwardly extending lip, the dependent rim being received in the relieved portion of the face and the outwardly extending lip being engaged in



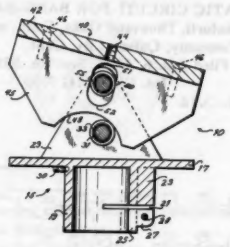
the undercut, the undercut having means to retain the outwardly extending lip in the undercut, the longitudinal extension having integrally molded threads about its periphery adapted to threadingly engage with a cooperating portion on an appliance when mounted thereon.

3,970,274

TILT MOUNTING

E. Edward Resk, 645 Pine Brook Blvd., New Rochelle, N.Y. 10804

Filed Oct. 30, 1974, Ser. No. 519,170
Int. Cl.² F16M *11/10*
U.S. Cl. 248—185 **9 Claims**



1. A tilt mounting for supporting equipment for selective tilting of the equipment, said mounting comprising:

a base frame having at least one upstanding arm,

a tilt table having at least one depending leg,

a downwardly facing arcuate cam surface carried by said tilt table leg,

a cam follower carried by said base frame arm and having a fixed axis with respect to said arm, said follower engaging said cam surface,

a slideway in said tilt table leg, and

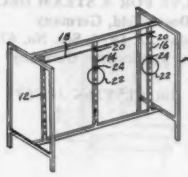
a pivot journal, carried by said base frame arm, slidably arranged within said slot, said pivot journal being formed with a threaded stud extending therethrough, a manually rotatable knob secured to an outer end of said stud, a brake plate threaded on the free end of said stud, a clutch washer on said stud between said brake plate and the tilt table leg adjacent thereto, whereby upon turning said knob to thread said screw into said journal, said washer will frictionally engage said leg to prevent pivoting of said tilt table.

3,970,275

DISPLAY RACK HOOK

Steve Swandiak, Yonkers, N.Y., assignor to Artcraft Wire Goods, Inc., Bronx, N.Y.

Filed Oct. 10, 1974, Ser. No. 513,551
Int. Cl.² A44B 21/00; A47F 7/08
U.S. Cl. 248—223 3 Claims



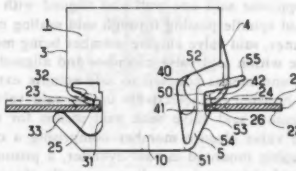
1. A hook for retaining a member on a display frame having a hollow upright formed with a plurality of vertically elongated and vertically spaced slots of a predetermined width including a unitary body, a first hook portion formed in said body with a downwardly opening mouth defined by a pair of legs, one of which is adapted to be received in one of said upright slots with said first hook portion supported on the lower edge of the slot, said first hook portion of said body being formed with a noncircular uniform cross section throughout its extent from the other leg through said one leg, said cross section having a minor dimension less than said slot width to permit said first hook portion to be inserted in said slot in a vertical orientation of the body and having a major dimension greater than said slot width to prevent twisting of said body around its longitudinal axis when said first hook portion is in said slot, a second hook portion formed in said body with an upwardly opening mouth defined by a pair of legs, and a portion of said body connecting the other leg of the first hook portion to one of the legs of the second portion, said mouths being generally aligned, the end of said one leg of said first hook portion facing the end of the other leg of the second hook portion, the distance between said leg ends being less than the space between adjacent upright slots, the space between the legs of the first hook portion and the lengths of said first hook portion legs being such as to inhibit removal of said hook from said upright by rotation with said first hook portion resting on said slot edge.

3,970,276

DEVICE FOR FIXING AN OBJECT

Jean Debaigt, Maisons-Laffitte, France, assignor to C.G.E.E.-Alsthom, Levallois-Perret, France

Filed Nov. 10, 1975, Ser. No. 630,125
Claims priority, application France, Nov. 25, 1974, 74.38587
Int. Cl.² H01R 9/22
U.S. Cl. 248—223 8 Claims



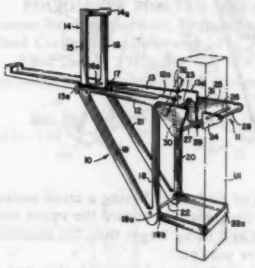
1. In a device for fixing an object on a support formed by laterally spaced, parallel edges forming an insertion face for the insertion of the object between those edges, an opposite face to the insertion face and two rims each formed by a respective one of the edges, said object comprising two opposite sides each co-acting with one of the edges of the support, the improvement wherein: the object comprises, on each side a fixed lateral stop which presses against the rim facing the support and, on a first side, a first flexible tab pressing against the insertion face of a first edge of th support and a rigid tab which abuts the opposite face of that edge and, on the second side, a second flexible tab which presses against the insertion face of the second edge of the support and a ratching tab ratching on the opposite face of that second edge.

3,970,277

SCAFFOLD BRACKET

Henry J. Riblet, 87 Crescent Road, Needham, Mass. 02194

Filed Oct. 15, 1974, Ser. No. 514,583
Int. Cl.² A47B 47/00
U.S. Cl. 248—246 9 Claims



1. In a scaffold bracket for use with an upright post,
said bracket being of the type employing a rigid frame for supporting a platform, and a lock having side members,
said rigid frame being supported by said side members in a manner permitting relative rotation only between said lock and said frame about a pivotal axis,
said side members carrying an inner jaw and an outer jaw in a manner permitting the upright to be received between said jaws and said side members and causing said jaws to clamp said upright when a downward, oblique force is exerted upon the pivotal axis,
said inner jaw being located between and below said pivotal axis and said outer jaw, when said lock is in the locked position,
the improvement comprising attachment means on said side members, said attachment means being situated between the pivoted axis and said inner jaw and said attachment means being adapted to be engaged by a hoisting mechanism.

3,970,278

JACK STAND

Altee C. Studer, 9818 Hawley Road, El Cajon, Calif. 92021

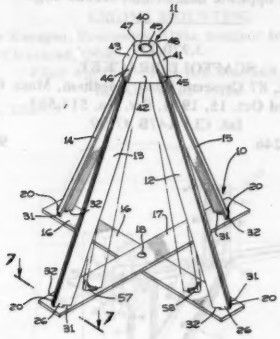
Continuation-in-part of Ser. No. 477,697, June 10, 1974, abandoned. This application Dec. 3, 1975, Ser. No. 637,132
Int. Cl.² B60S 9/02
U.S. Cl. 248—352 6 Claims

1. A stationary jack stand comprising a base having a plurality of upwardly open recesses equally spaced from each other at the perimeter,
a cap having an equivalent number of downwardly open pockets in a grouping closer together than said recesses in the base,
each pocket having two adjoining walls in right angular relationship relative to each other forming an angular corner with said angular corner facing laterally outwardly,
and fixed partitions integral with the cap separating each pocket from all of the other pockets,

each pocket having a closed inner end and having a cross sectional shape diminishing progressively from an open outer end to said inner end,

and a set of struts equal in number to the number of recesses in the base,

the lower end of each strut having a projection adapted to fit slideably and releasably in the respective recess in the base and shoulder means adapted to overlie the base,



the upper end of each strut having a cross sectional shape diminishing progressively toward the upper end,

the uppermost end being larger than the innermost end of the respective pocket,

the upper end of the strut being slideably and releasably receivable in the respective pocket of the cap.

3,970,279

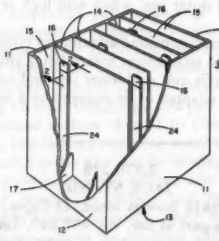
MOLD ASSEMBLY FOR PRODUCING MULTI-PARTITIONED CONTAINERS HAVING METAL CONNECTORS THROUGH THE PARTITIONS

Salvador Silveyra, Monterrey, Mexico, assignor to Aislantes Leon, S.A., Monterrey, Mexico

Division of Ser. No. 376,867, July 5, 1973. This application July 14, 1975, Ser. No. 595,963

Int. Cl. B29c *6/00*

U.S. Cl. 249—96 **8 Claims**



1. A mold assembly adapted for molding mult-partitioned containers from a moldable material and having enclosing sides and bottom walls and at least one internal partition dividing the container into a plurality of independent compartments where such partition has a metal connector extending within and through the partition to provide electrical conduction between adjacent compartments of the container which comprises in combination a core member and a cavity member for receiving the core member, such core member having a plurality of depending core segments where at least one of the core segments has a elongated slot extending upwardly from the bottom of the core segment and adapted to receive and hold the metal connector during the molding of the container so that upon completion of the molding, the metal connector is lock molded into the desired position within and through the partition and providing a fluid tight seal about the metal connector.

3,970,280

VENTING VALVE FOR A STEAM DECORTICATOR

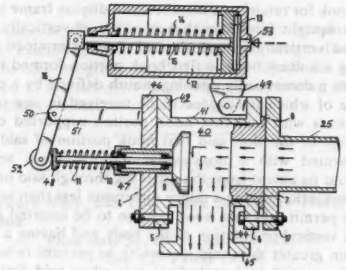
Paul Kunz, 5419 Doettesfeld, Germany

Filed May 22, 1974, Ser. No. 472,216

Claims priority, application Germany, May 24, 1973, 2326609

Int. Cl.² F16K *31/163*

U.S. Cl. 251—58 **10 Claims**



1. A venting valve for a pressure vessel, comprising a housing defining a valve chamber, and having an inlet passage extending into said chamber for venting gas, and an outlet passage extending from said chamber at an angle to said inlet passage, replaceable valve seat means in said chamber, a valve closure member movably mounted in said chamber out of contact with the inner walls of said chamber to engage said valve seat for closing the valve, said valve closure member being movable to a position to deflect gases from said inlet passage to said outlet passage, means normally biasing said valve to its open position, said valve chamber comprising respective valve chamber walls, said inlet passage extending through one wall of said valve chamber, said outlet passage extending at an angle to said inlet passage through another wall of said valve chamber, said valve seat means comprising a tubular valve seat removably mounted in said inlet passage, a spindle, sealing means extending through a wall of said valve chamber opposite said one wall and aligned with said inlet passage, said spindle passing through said sealing means in a sealed manner, said valve closure member being mounted on said spindle within said valve chamber and aligned with said valve seat, and means coupled to said spindle externally of said valve housing for selectively urging said valve closure member against said valve seat, said means for selectively urging said valve closure member comprising a cylinder, a piston slideably mounted in said cylinder, a piston rod connected to said piston and extending externally of said cylinder, and a pivoted lever coupling the external end of said piston rod to said spindle, said cylinder having a pressure inlet opening, whereby application of pressure to said pressure inlet opening effects movement of said piston, piston rod, lever and spindle to move said valve closure member against said valve seat within said chamber.

3,970,281
VACUUM VALVE CONSTRUCTION

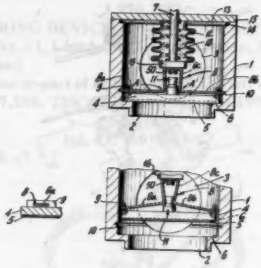
Anton Heeb, Mauren, Liechtenstein, assignor to Balzers Patent und Beteiligungs AG, Liechtenstein

Filed Mar. 24, 1975, Ser. No. 561,621

Claims priority, application Switzerland, Mar. 29, 1974, 4387/74

Int. Cl.² F16K *31/44*

U.S. Cl. 251—77 **9 Claims**



1. A valve construction comprising a valve housing having an inlet passage and a discharge passage, a valve seat defined within said housing between said inlet passage and said discharge passage, a valve disc engageable on said valve seat to close the communication between said valve inlet passage and said valve discharge passage, said valve disc having a top surface with opposite upright extensions adjacent its respective sides each with an opening therethrough, a drive member movable to move said valve disc toward and away from said seat, means defining a cam lever receiving groove spaced from said seat alongside the extension openings when said valve disc is engaged on said valve seat, a cam lever having a central portion connected to said drive member and disposed between said drive member and said valve disc and including a lever arm portion on each side extending through the respective openings of said each extension and being engageable in the receiving grooves during closing movement.

3,970,282
MAGNETIC VALVE

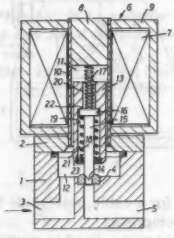
Egon Jorgen Hansen, Sonderborg, Denmark, assignor to Danfoss A/S, Nordborg, Denmark

Filed Dec. 9, 1974, Ser. No. 530,706

Claims priority, application Germany, Dec. 10, 1973, 2361398

Int. Cl.² F16K *31/06*

U.S. Cl. 251—129 **2 Claims**



1. A magnetic valve assembly comprising casing means, a valve seat and a linearly movable closure member cooperable with said seat, an armature member connected to said closure member having an energized valve open position and a nonenergized valve closed position, a load spring having one end fixed relative to said casing for biasing said closure member to a closed position, said loan spring having a constant predetermined stress when said closure member is in its closed and open position, energy storing spring means between said closure member and said armature member resiliently resisting relative movement between said members, said load spring being stiffer than said energy storing spring means, said energy storing spring means being stressed to an extent equal to said predetermined stress prior to said armature member reaching the energized end of its stroke, said armature member having a stepped central bore forming a counter, said closure member entering said bore from one end and engaging said counter, said load spring entering said bore from the other end and engaging said closure member.

3,970,283
POURING OF MOLTEN METALS

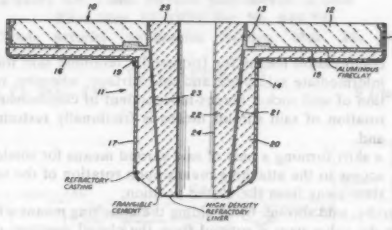
Robert Duncan Hind, Rotherham, England, assignor to United States Steel Corporation, Pittsburgh, Pa.

Filed Jan. 9, 1975, Ser. No. 539,667

Claims priority, application United Kingdom, Jan. 15, 1974, 1913/74

Int. Cl.² B65D *47/00*; B67D *3/02*

U.S. Cl. 251—144 **3 Claims**



1. In a sliding gate which includes a refractory sliding plate having an orifice, and a collector nozzle extending from said plate in line with said orifice,

the improvement in which said nozzle comprises:

an insulating tubular refractory member having a downwardly tapered bore;

a tubular liner of erosion-resistant refractory within said tapered bore and having a conforming downwardly tapered outer surface and a cylinderical bore; and

a layer of frangible refractory cement between the tapered surfaces of said tapered bore and said liner affixing said liner within said member;

said liner being readily removable from said member on breaking of said cement.

3,970,284
SAFETY DEVICE FOR USE WITH CHLORINE CYLINDER VALVES

George H. Cobbe, Jr., 3411 S. Camino Seco No. 46, Tucson, Ariz. 85730

Filed Apr. 7, 1975, Ser. No. 566,033

Int. Cl.² F16L *29/00*

U.S. Cl. 251—149.9 **3 Claims**

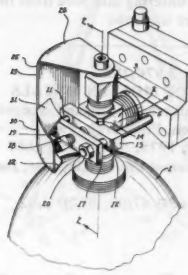
1. In a standard chlorine cylinder valve having attaching means for detachably engaging a receiving orifice to a valve outlet fitting, a valve stem mounted shroud for constraining detachment of the receiving orifice unless the valve stem is in the closed position, said shroud comprising in combination:

a. socket means for engaging the valve stem;

b. a downwardly extending shroud means depending from said socket means for partially circumscribing the valve, said shroud means being positionable about the valve

stem axis commensurate with the rotational position of the valve stem;

c. clutch means disposed intermediate said socket means and said shroud means for accommodating reorientation of the closed position of the valve stem due to wear while maintaining the position of said shroud means with respect to the valve stem to shield the attaching means whenever the valve stem is rotated from the closed position, said clutch means comprising an annular flange disposed about said socket means, a plate for maintaining said flange against a surface of said shroud means and



compression means for frictionally retaining said flange intermediate said plate and said surface, whereby, rotation of said socket means independent of commensurate rotation of said shroud means is frictionally restrained; and

d. a skirt forming a part of said shroud means for shielding access to the attaching means upon rotation of the valve stem away from the closed position;

whereby, said shroud, by shielding the attaching means whenever the valve stem is rotated from the closed position, constrains disconnection of the outlet pipe from the outlet fitting whenever the valve is partially or fully open.

3,970,285

BALL VALVE ASSEMBLY

Harold J. Lonn, Lombard, Ill., assignor to Henry Valve Company, Melrose Park, Ill.

Filed Oct. 29, 1974, Ser. No. 518,489
Int. Cl.² F16K 31/44
U.S. Cl. 251—214 **10 Claims**

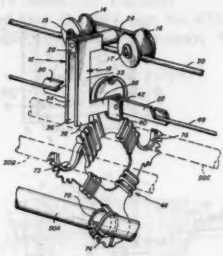
1. A ball valve assembly comprising, in combination: a valve body member, a valve ball, a valve stem, and a cover member, said valve body member including a central chamber in which said valve ball is rotatably mounted, aligned inlet and outlet passageways, and a valve stem mounting aperture in communication with said chamber and oriented outwardly therefrom, said valve stem being rotatably received in said stem mounting aperture and extending outwardly therefrom including means at an inner end of said stem for fixed rotational connection to said valve ball, means maintaining a fixed axial relation between said stem and said mounting aperture, means for rotating said stem located at the portion of said stem extending from said mounting aperture, a cover member removably securable to said valve body member for covering the extending portion of said valve stem and the outer end of said mounting aperture, and an annular stem seal for further preventing the escape of fluid through said valve stem aperture, said annular stem seal retained between said cover member and said body member in an annular recess in one of said members encircling said valve stem in coaxial and spaced relation thereto, said annular seal being confined in said recess by an annular protuberance extending from the other of said members in mating relation to said recess.

3,970,286

APPARATUS FOR USE IN STRINGING POWER LINES

Arthur W. Ross, 94 Brimbal Ave., Boston, Mass. 01915

Continuation-in-part of Ser. No. 503,040, Sept. 3, 1974, Pat. No. 3,908,962. This application Apr. 18, 1975, Ser. No. 569,164
Int. Cl.² E21C 29/16
U.S. Cl. 254—134.3 R **13 Claims**



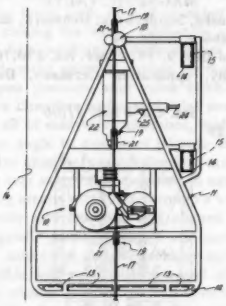
1. An apparatus for installing a power distribution line having a plurality of individual wires including a supporting wire being installed between existing poles and wherein said wires are finally supported from said supporting wire by means of an insulating spacer, said apparatus comprising a pulley, means for supporting said pulley including a shaft extending through said pulley, a C-shaped support member having a top end for receiving said shaft and thereby supporting the pulley at the top end thereof, said C-shaped support member having opposing parallel walls defining a lower leg at the lower end of the support member and a post extending between said walls of said lower leg and for supporting said spacer.

3,970,287

GUIDE BLOCK FOR A CABLE

David S. Robards, Cincinnati, Ohio, assignor to Hi-Lo Powered Stirrups, Inc., Cincinnati, Ohio

Filed Jan. 28, 1975, Ser. No. 544,856
Int. Cl.² B66D 1/36
U.S. Cl. 254—190 R **6 Claims**



1. A guide block for a cable, said guide block being of the open breach type comprising

two U-shaped hand plates fixed in position relative one to the other, said plates being separated one from the other a distance at least slightly greater than the diameter of that cable to be guided therethrough,

each hand plate being structured to provide a hole therethrough and a slot extending from that hole to one edge of said plate, each hole diameter being at least about 1.6

times greater than the cable diameter, and each slot width being not more than about 1.3 times the cable diameter, each hand plate being oriented relative to the other so that said holes are concentrically disposed and such that said slots face in opposite directions one from the other, and said hand plates being fixed relative one to the other so as to define a mouth to provide access to said slots for said cable intermediate the ends of said cable.

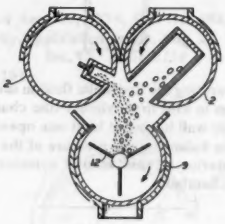
3,970,288
METERING DEVICE AND MIXING APPARATUS

Frank Brooks, 11, Lansdowne Road, Atherton, near Manchester, England

Continuation-in-part of Ser. No. 407,032, Oct. 16, 1972, Pat. No. 3,887,168. This application Jan. 24, 1975, Ser. No. 543,743

Int. Cl.² B01F *15/02*

U.S. Cl. 259—7 **8 Claims**



1. Apparatus for delivering to a receiver a mixture in predetermined proportions of particulate materials, comprising:
   a source of each of the materials;
   a shroud positioned below each source;
   metering means interposed between the source and the shroud and adapted at each actuation of the metering means to feed a measured quantity of each materal from the respective source to the shroud;
   the shroud serving to house mixing means, such that the feeding of material by said metering means is into said mixing means which rotates synchronously with the feeding motion of said metering means, said shroud also having discharge slots, such that said materials are discharged to a receiver;
   and drive means for actuating the metering means, and for rotating the mixer means.

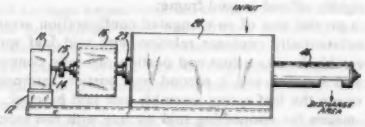
3,970,289
VARIABLE RATE OPPOSING ROTATIONAL MIXER AND FEEDER

Joel Dimas Vian, Passaic, N.J., assignor to Joseph Rich, Jr., East Rutherford and Adolf Alvarez, Passaic, both of, N.J., part interest to each

Filed Oct. 21, 1974, Ser. No. 516,652

Int. Cl.² B01F *7/02*

U.S. Cl. 259—103 **5 Claims**



1. A variable rate opposing rotational material mixer and feeder, comprising:
   a. a mixing box having a longitudinal axis and containing a solid flight screw and a circumferential tumbler mixing element said solid flight screw being disposed along said longitudinal axis;
   b. motor and gear drive means including means for axially rotating said flight screw in a given direction of angular rotation;
   c. mid circumferential tumbler mixing element being disposed coaxially with and circumferentially about as said solid flight screw;
   d. said motor and gear drive means for axially rotating said circumferential tumbler, in an angular direction opposite to the direction of rotation of said flight screw integrally surrounding said means for axially rotating said flight screw;
   e. said flight screw serving to convey materials mixed in said mixing box by said mixing tumbler continuously through a communicating discharge cylinder extending coaxially from said mixing box to discharge outlet whereby the opposing rotations of said tumbler and said flight screw cause both an improved simultaneously mixing and discharging of said materials.

3,970,290
ARRANGEMENT FOR FEEDING

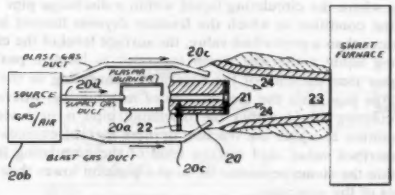
Sven Santen, Hofors, and Carl Erik Grip, Lulea, both of Sweden, assignors to SKF Industrial Trading and Development Company, B.V., Jutphaas, Netherlands and Norrbottens Jarnverk AB, Lulea, Sweden, part interest to each

Filed Mar. 11, 1974, Ser. No. 449,784

Claims priority, application Sweden, Mar. 26, 1973, 7343333

Int. Cl.² F27B *1/16*

U.S. Cl. 266—138 **5 Claims**



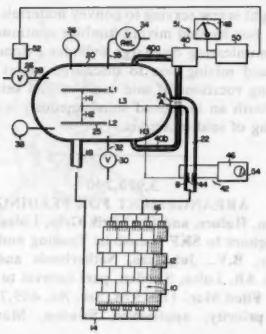
1. In a shaft furnace which includes a tuyere, the improvement in combination therewith comprising an apparatus operable with a source of supply gas and a source of additional fuel, for increasing the blast gas temperature and supplying and substantially completely burning said additional fuel at the tuyere level in said furnace, comprising:
   a. plasma burner means for heating said gas, said plasma burner means having an inlet for receiving supply gas from said source of gas and an outlet for discharging said heated gas, and
   b. means for conveying said heated gas from said plasma burner means outlet to said tuyere comprising a nozzle defining
      i. a first passage having an inlet communicating with said plasma burner means outlet, for receiving said heated gas therefrom, and an outlet opening,
      ii. a fuel passage having an inlet communicating with said source of additional fuel, and an outlet formed as substantially annular opening disposed around said first passage outlet opening, and
      iii. a blast gas passage having an inlet for receiving gas from said source of gas and an outlet formed as a second substantially annular opening surrounding said fuel passage outlet opening, whereby said additional fuel, blast gas, and heated gas mixed in said tuyere.

3,970,291

METHOD OF PREVENTING OCCURRENCE OF PULSATION IN A CIRCULATING LIQUID FOR EVAPORATIVE COOLING

Takeo Yamada; Kazuo Kunioka, and Toyokazu Teramoto, all of Yokohama, Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 26, 1974, Ser. No. 536,481
Claims priority, application Japan, Dec. 28, 1973, 49-956
Int. Cl.[2] C21B 7/10
U.S. Cl. 266—193 6 Claims



1. A method of preventing occurrence of pulsation in circulating liquid for evaporative cooling flowing through a cooling stave of a blast furnace, comprising the first step of maintaining, where the circulating liquid within a discharge pipe is in a first condition in which the fraction dryness thereof is not greater than a prescribed value, the surface level of the circulating liquid within the steam separator to be at a position higher than an inlet of the separator connecting to the discharge pipe, and the second step of maintaining, where the circulating liquid within the discharge pipe is in a second condition in which the fraction dryness thereof exceeds said prescribed value, said surface level of the circulating liquid within the steam separator to be at a position lower than said inlet of the separator.

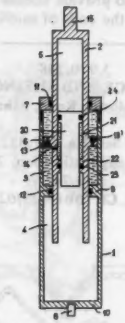
3,970,292

OIL AND AIR SUSPENSION DEVICES

Augustin Dachicourt, and René Krin, both of Boulogne-Billancourt, France, assignors to Regie Nationale des Usines Renault, Boulogne-Billancourt and Automobiles Peugeot, Paris, both of, France

Filed Mar. 13, 1975, Ser. No. 557,972
Claims priority, application France, Mar. 14, 1974, 74.08650
Int. Cl.[2] F16F 5/00
U.S. Cl. 267—64 R 2 Claims

1. A hydraulic oil and air suspension device for motor vehicles comprising, in combination, a first cylinder having an interior, means for dividing the interior of said first cylinder into a pair of axially spaced chambers, a gas in one of said first cylinder chambers and a hydraulic fluid in the other of said first cylinder chambers, a second cylinder having a side wall defining an interior and closed at each end arranged for sliding movement in the interior of said first cylinder, an immiscible hydraulic fluid and pressurized gas in the interior of said second cylinder, an annular flange on the outer surface of said second cylinder slidably engageable with the inner wall of said first cylinder for guidably positioning said second cylinder for said sliding movement, a plurality of check valves in said flange for controlling the flow of hydraulic fluid in opposite directions within said first cylinder other chamber, a piston having a head and a shank slidably positioned in the interior of said second cylinder, said head being arranged for sliding sealing engagement with the inner wall of said second cylinder to separate the hydraulic fluid from the pressurized gas in said second cylinder, sealing means in said second cylinder between said piston shank and the inner wall of said second



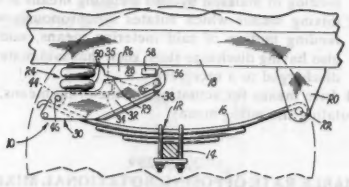
cylinder for separating the hydraulic fluid in said second cylinder from the gas in said first cylinder one chamber, said second cylinder side wall having at least one opening on one side of said flange for balancing the pressure of the hydraulic fluid between the interior of said second cylinder and said first cylinder other chamber.

3,970,293

SUSPENSION SYSTEM

Philip J. Sweet; Buck C. Hamlet, and David L. Sweet, all of Fresno, Calif., assignors to American Carrier Equipment, Fresno, Calif.

Continuation-in-part of Ser. No. 401,241, Sept. 27, 1973, Pat. No. 3,866,894. This application Jan. 31, 1975, Ser. No. 546,189
Int. Cl.[2] B60G 11/44
U.S. Cl. 267—31 1 Claim



1. In a vehicle suspension system for a vehicle having a frame, an axle, a leaf spring assembly disposed beneath said frame and mounted on said axle in transverse relation therewith, and a collapsible air bag interposed between said leaf spring assembly and said frame, the improvement comprising:

A. a bracket of an inverted U-shaped cross sectional configuration disposed above said leaf spring assembly and rigidly affixed to said frame;

B. a pivotal arm of an elongated configuration arranged in substantially coplanar relation with said leaf spring assembly having a first end portion pivotally connected to said bracket and a second end portion interposed between the leaf spring assembly and said bracket;

C. means for connecting said air bag with the second end portion of said arm and with said frame;

D. bearing means affixed to the second end portion of said arm in spaced relation with the first end portion of said arm seated on said leaf spring assembly in a supported relationship therewith;

E. load supporting means including first stop means defining motion arresting surfaces on said bracket above said arm in spaced relation with the first end portion thereof, and second stop means defining a motion arresting surface on said arm in spaced relation with the first end portion thereof for engaging said first stop means in a load supporting relationship therewith in response to a collapse of said air bag; and

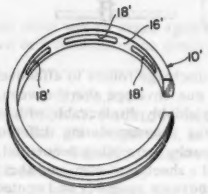
F. motion limiting means including a stop lug rigidly affixed to said bracket adjacent the first end portion of said arm, and an upstanding ear projected from the first end portion of said arm for engaging said stop lug for arresting pivotal motion of said arm in response to expansion of said air bag.

3,970,294

SYNCHRONOUS RING IN A SYNCHRONOUS DEVICE

Tamio Kawamoto, Yokohama, and Mitugu Ii, Yokosuka, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Aug. 20, 1974, Ser. No. 498,926
Claims priority, application Japan, Aug. 21, 1973, 48-93641
Int. Cl.² F16F *1/34*
U.S. Cl. 267—161 **5 Claims**



1. In a synchronous device for changing speed gears of a motor vehicle, in which a slotted, springy, synchronous ring, which has an inner circumference, is affectable by servo action, the improvement comprising a plurality of grooves for reducing synchronous capacity of the synchronous device, said grooves being disposed in said inner circumference of said synchronous ring in spaced circumferential relationship with each other.

3,970,295

PIPE FITTING LOCATOR APPARATUS

Cleveland N. Cooper, Kirkwood, Mo., assignor to The Pandjiris Weldment Co., St. Louis, Mo.

Filed Feb. 3, 1975, Ser. No. 546,206
Int. Cl.² B23Q *3/00*
U.S. Cl. 269—17 **5 Claims**

1. In a track-mounted, pipe fitting locator apparatus:

a. base means including a plurality of track-engaging wheels and a vertical pivot axis,

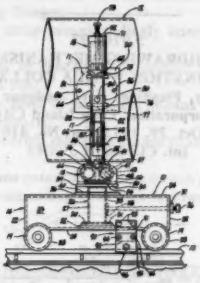
b. radially extending arm means mounted to the base means for swinging movement about the pivot axis of the base means,

c. first carriage means mounted to the arm means for adjustable longitudinal movement toward and away from the vertical pivot axis of the base means,

d. post carried by the first carriage means and having a longitudinal axis substantially parallel to the pivot axis of the base means,

e. second carriage means mounted to the post means for adjustable longitudinal and rotational movement relative toe the post means said second carriage means including support means for the pipe fitting,

f. horizontal adjustment means between the first carriage means and the arm means providing both coarse and fine adjustment of the radial distance of the carriage means from the pivot axis of the base means,



g. clamping means clamping said first carriage means to said arm means at a selected radial distance from said pivot axis of said base means, and

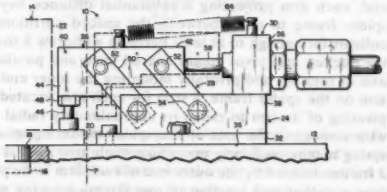
h. another clamping means clamping said arm means to said base means.

3,970,296

WORK HOLDING CLAMP

William Watson Rameson, Santa Monica, Calif., assignor to TRW Inc., Redondo Beach, Calif.

Filed Aug. 4, 1975, Ser. No. 601,948
Int. Cl.² B23Q *3/08*
U.S. Cl. 269—32 **5 Claims**



1. A work clamp for clamping a workpiece to a work table comprising:

a base to be attached to the work table with a surface of the base seating against the table;

a generally L-shaped clamp member including a first leg overlying said base and a second transverse leg at one end of said first leg comprising a work engaging pressure foot facing the plane of said base surface;

parallel links pivotally attached to said base and first clamp member leg forming with said clamp member and base a parallelogram linkage arrangement supporting said clamp member on said base for extension and retraction relative to said base in a manner such that said extension movement occurs longitudinally of said first leg toward one end of said base and across a plane normal to said base surface plane and located a distance beyond said one base end and simultaneously laterally of said first leg toward said base surface plane to a clamping position wherein said pressure foot is located beyond said normal plane for clamping engagement with a workpiece located beyond said normal plane, and said retraction movement occurs laterally of said first leg away from said base surface plane and longitudinally of said first leg toward the other end of said base to a retracted position wherein said clamping member is located entirely at the base side of said plane to clear said workpiece for placement on and removal

from said work table along a direction line normal to said table; and

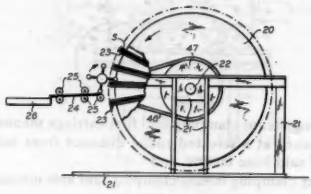
fluid pressure actuator means for extending and retracting said clamp member.

3,970,297

SHEET WITHDRAWING MECHANISM AND ITS COMBINATION WITH A COLLATOR

Frank C. Blowsky, Flushing, N.Y., assignor to Luis Mestre Development Corporation, Long Island City, N.Y.

Filed Oct. 29, 1973, Ser. No. 410,900
Int. Cl.² B65H *39/045*
U.S. Cl. 270—58 41 Claims



1. A sheet withdrawing mechanism for a collator having repeat cycles and a plurality of movable spaced partitions forming pockets a plurality of which each contain a pile of sheets comprising spider means to at least partially withdraw sheets from the pockets, the spider means including at least one spider, means mounting the spider means for rotation on an axis of rotation, each spider including a spider frame, arm means carried by the spider frame including at least one arm extending radially or approximately radially outwardly with respect to the axis, each arm having an inner end and an outer end, each arm projecting a substantial distance beyond the spider frame to enter between the spaced partitions of the collator far enough to at least partially withdraw a sheet from the pocket, arm pivot means spaced from and parallel to the axis of rotation and pivotally mounting the inner end of each arm on the spider frame, a stop for each arm located to limit pivoting of its arm to radial or approximately radial position with respect to the axis of the spider mounting means, arm spring means resiliently propelling each arm against its stop, a friction carried by the outer end of each arm to be projected into a pocket and rotating in one direction in the path of a circle around the axis of rotation, and the spacing between each successive friction member measured along its arc of rotation being greater than the spacing between partitions such that the friction member enters its pocket above the pile of sheets and engages the top sheet in the pile of sheets in the pocket.

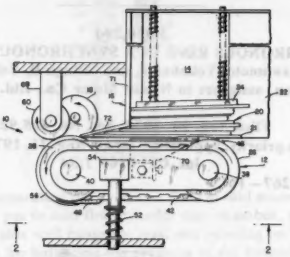
3,970,298

MIXED THICKNESS SHEET SEPARATOR AND FEEDER

Robert Irvine, Riverside, and L. Neil Kanning, Darien, both of Conn., assignors to Pitney-Bowes, Inc., Stamford, Conn.

Filed June 5, 1975, Ser. No. 584,002
Int. Cl.² B65H *3/04*
U.S. Cl. 271—34 1 Claim

1. A sheet separator and feeder apparatus suitable for high speed mail handling and mechanical processing of unsorted mail articles comprising magazine feeding means for holding a plurality of mail articles, said magazine means further accommodating a range of different sizes and thicknesses of intermixed envelopes, a conveyor assembly having movable engagement means for frictionally contacting successive envelopes, said conveyor assembly including a drive gear, a spaced apart idler gear, and engagement means including at least one belt disposed between and driven by said gears, said belt having a feed pad integral therewith and projecting from the surface of the belt, said idler gear supporting two spaced apart discharge rollers thereon, two spaced apart idler rollers being in engagement with said discharge rollers, automatic wear compensating means for movably urging said discharge rollers into said engagement with said idler rollers, separator means co-operatively interacting with the conveyor assembly for controlling envelope output delivery by retarding passage of more than one envelope therebetween, said separator means including a separator roller, said separator roller being horizontally offset and vertically staggered between the two discharge rollers with an overlap of the respective peripheral surfaces of the discharge roller and the separator roller, the separator roller being further rotatably driven in reverse direction from the discharge rollers to effectively restrain passage of more than one envelope therebetween, the conveyor assembly being yieldably displaceable with respect to the separator means for accommodating different envelope thicknesses and thereby permitting sequential delivery of single envelopes, and a sheet limit stop, said sheet limit stop extending from the conveyor assembly and contacting the envelopes in the magazine means for spacing said envelopes away from the conveyor belt, whereby inter-envelope frictional force is reduced during contact of the envelopes by the engagement means and adhesion between adjacent envelopes is minimized.



3,970,299

SHEET REGISTRY DEVICE

Emil J. Berger, Jr., Hatfield, Pa., and John M. Mitchard, Cherry Hill, N.J., assignors to Union Camp Corporation, Wayne, N.J.

Filed Dec. 13, 1974, Ser. No. 532,648
Int. Cl.² B65H *9/10*
U.S. Cl. 271—250 1 Claim

1. A sheet registry device in a sheet-handling machine for aligning a sheet in a cross-machine direction comprising:

means to support a sheet and convey such sheet aligned in a machine direction;

a side guide positioned to align a sheet in a cross-machine direction;

a constantly rotating brush having projecting bristles positioned in the path of the moving sheet and adapted to receive the sheet thereunder;

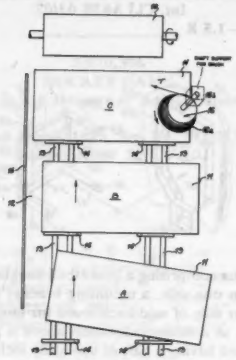
a shaft for said brush positioned above said sheet to provide an oblique direction of rotation of said brush with respect to the edge of said sheet;

supporting means to support said shaft;

said shaft being tilted within a range of 5° to 30° from the perpendicular to the plane of the sheet and being angularly positioned so that the bristles in the outer edge of said brush exert a force on the top surface of the sheet and move said sheet in the direction of the side guide solely by the rotation of said brush;

the ends of the bristles of the rotating brush exerting a force against the top surface of the sheet in a direction toward said side guide, the said force being sufficient to move the

sheet from an edge thereof and still permit easy passage of the moving sheet through the bristles;



whereby the said sheet will be urged against the side guide and be aligned in a cross-machine direction.

3,970,300

RECREATIONAL FACILITY SLIDE

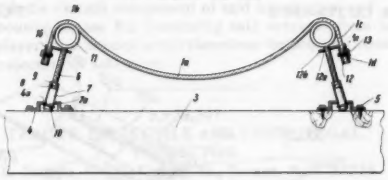
Karl Freiherr von Wendt, Gevelinghausen, and Klaus Becker, Wetter (Ruhr), both of Germany, assignors to Demag Aktiengesellschaft, Duisburg, Germany

Division of Ser. No. 341,903, March 16, 1973, abandoned. This application Oct. 17, 1974, Ser. No. 515,456

Claims priority, application Germany, Mar. 18, 1972, 2213268

Int. Cl.² A63G *21/00*

U.S. Cl. 272—56.5 R **7 Claims**



1. An artificial, downhill, snowless run including a meandering course running from an upper level to a lower level, characterized by

a. a plurality of prefabricated elongated slide segments;

b. said segments being placed in an end-to-end fashion to define said course, with a portion of said plurality of segments being curved and a portion being straight to define the meandering nature of said course;

c. each of said segments including integral flanges along each side edge thereof, with each flange being an inverted U-shape in cross section;

d. tube-shaped rail means extending longitudinally along each side edge of said course for supporting said U-shaped flanges;

e. a plurality of spaced apart strut means positioned along each side of said course;

f. one end of each slide segment being supported upon said strut means with the other end supported on the next succeeding slide segment;

g. said tube-shaped rails being positioned on the upper ends of said strut means;

h. integral depending flanges on each of said side flanges;

i. butt strap means removably connected to each of said depending flanges;

j. said butt strap means slidingly connected to said strut means;

k. a plurality of spaced apart ground supports positioned along said run;

l. the lower ends of said strut means positioned on said ground supports;

m. means securing said strut means to said ground supports; and

n. cable means extending between each ground support and the next succeeding strut means downhill thereof.

3,970,301

THREE-DIMENSIONAL NETWORK

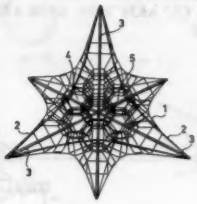
Conrad Roland Lehmann, Bismarckallee 4, 1 Berlin 33, Germany

Continuation-in-part of Ser. No. 456,124, March 29, 1974, abandoned. This application Aug. 15, 1974, Ser. No. 497,823

Claims priority, application Germany, Mar. 29, 1973, 2316141

Int. Cl.² A63B *7/04*, *17/04*

U.S. Cl. 272—113 **48 Claims**



1. A spatial network, in particular a climbing device for children, comprising a three-dimensional inner net of tensile members, and a three-dimensional outer net which serves to hold the inner net , said three-dimensional outer net comprises tensile members forming polyhedra and polygonally curved edges and doubly-curved faces, said polyhedra having no more than eight vertices and having their faces, in operation, at an angle to the vertical and said three-dimensional inner net comprises at least one tensile member forming a continuous ring, said ring forming several interlinked polygons having faces defined by its edges which consist of said tensile members.

3,970,302

EXERCISE STAIR DEVICE

Richard McFee, 852 Ostrom Ave., Syracuse, N.Y. 13210

Continuation-in-part of Ser. No. 483,539, June 27, 1974, abandoned. This application Jan. 8, 1975, Ser. No. 539,585

Int. Cl.² A63B *21/00*, *23/04*

U.S. Cl. 272—130 **13 Claims**

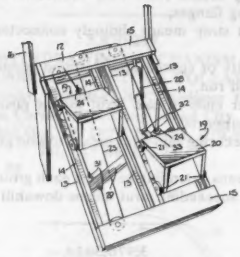
1. An exercise stair device comprising

two foot supports, each said support being movable in a reciprocating manner,

first means for guiding each of said foot supports along adjacent paths having vertical components, said first means including a pair of inclined tracks each said track having a respective one of said foot supports movably mounted thereon,

second means for coupling said foot supports together to move in opposite directions in said respective paths, and

third means for causing said foot supports to descend at constant velocity under the weight of a user and for dissipating energy transmitted to said foot supports during use of the device by a simulated climbing activity of the user.

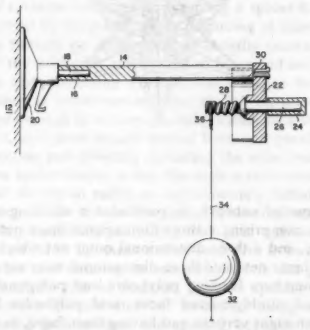


3,970,303

GAME AND TOY APPARATUS

Richard M. Levering, Bellmore, N.Y., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed June 19, 1975, Ser. No. 588,490
Int. Cl.[2] A63F 9/00; A63B 67/00
U.S. Cl. 273—1 R **8 Claims**



1. A toy and game apparatus comprising an elongated shaft, a first end of said shaft terminating in means to removable mount the same to a vertical support, the second end of said shaft terminating in an eccentrically mounted shield, said shield defining a substantially centrally disposed aperture therein, a second shaft disposed in said aperture and being journalled for rotational movement therein, a first end of said second shaft communicating with a knurled knob, a second end of said second shaft communicating with a threaded column, said column being operative for rotational movement upon the journal movement of said second shaft when said knob is rotated, a tether cord having a predetermined length and looped means on one end thereof, said looped means adapted to engage said threaded column, a weighted object slidably positioned along the length of said tether cord.

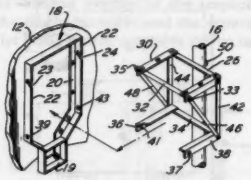
8. A method of playing the game as defined in claim 1 comprising horizontally mounting said apparatus on a vertical support above a floor at approximately the height of a player, positioning said tether cord including said object on said apparatus by engaging said column by said loop means, rotating said knurled knob until such time that the cord and object are released from said column and catching said object prior to the same reaching the floor with the hand used to rotate said knob.

3,970,304

BASKETBALL BACKBOARD AND SUPPORT

John W. Ebstein, Roslyn Heights, and Mario Cambardella, Manhasset, both of N.Y., assignors to Gabriel Industries, Inc., New York, N.Y.

Filed Mar. 17, 1975, Ser. No. 559,189
Int. Cl.[2] A63B 63/02
U.S. Cl. 273—1.5 R **10 Claims**



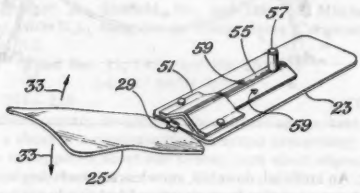
1. Apparatus comprising a basketball backboard adapted to have a net on one side, a mounting bracket for cooperation with the other side of said backboard for mounting the same on a support at a desired elevation above a playing surface, said backboard having a pair of upwardly inclined notches on a flange member projecting therefrom and generally perpendicular thereto, said bracket having a pair of fastener members lying in a generally horizontal plane and spaced a predetermined distance apart corresponding to the spacing of said notches so that each notch may receive one of said fastener members, a fastener for each fastener member for securing it in its associated notch, and additional means including an opening on said flange member for cooperation with mating structure on said bracket for removably securing said backboard to said bracket at an elevation below the elevation of said notches.

3,970,305

ATHLETIC WRIST SUPPORT

Luther M. Hawkins, 3625 Wilkie Way, Fort Worth, Tex. 76133

Filed May 6, 1975, Ser. No. 575,019
Int. Cl.[2] A63B 71/14
U.S. Cl. 273—54 B **7 Claims**



7. An athletic wrist support comprising:
arm means including arm plate means to be secured to the top of one's arm,
hand means including hand plate means to be secured to the top of one's hand,
hinge means having first and second members hinged together by a first pivot means,
said first member being secured to said arm plate means,
said second member being pivotally coupled to said hand plate means by a second pivot means,
said first pivot means allowing said hand means to pivot to positions above and below said arm means,
said second pivot means allowing said hand means to pivot to positions to the left and right of said arm means,
stop means secured to said arm plate means and having a portion extending above said hand plate means for allow-

ing said hand means to pivot to positions to the left and right and below said arm means but restricting movement of said hand means above said arm means,

means for securing said arm means to the top of one's arm, and

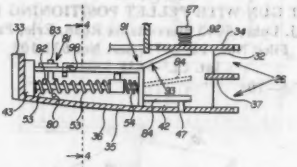
means for securing said hand means to the top of one's hand.

3,970,306

HOCKEY GAME

Carl E. Smith, Jr., 10 Hemenway Road, Framingham, Mass. 01701

Filed July 7, 1975, Ser. No. 593,213
Int. Cl.² A63F 7/06, 7/10
U.S. Cl. 273—85 F **5 Claims**



1. A hockey game comprising:

a miniature hockey goal for positioning on a playing surface;

a goalie member horizontally and vertically movable in front of said goal by a player attempting to intercept pucks shot on goal;

a miniature puck for shooting on goal;

a shooter having an actuator for receiving said puck, said actuator comprising a spring loaded firing mechanism manually energized and releasable to propel said puck in predetermined trajectories, said shooter being manually manipulatable by an opponent into selective orientations that establish said predetermined trajectories and comprising further vertical adjustment means for manually setting the vertical position of said actuator so as to establish the vertical component of said trajectories; and

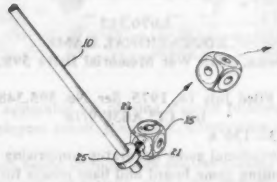
a housing means for concealing said actuator from said player so as to keep secret therefrom the selected vertical trajectory of said puck.

3,970,307

TARGET, PROJECTILE AND CENTRIFUGAL PROJECTOR

John E. Breglia, 818 E. Copper St., Tucson, Ariz. 85719

Continuation-in-part of Ser. No. 453,513, March 21, 1974, abandoned. This application Mar. 27, 1975, Ser. No. 562,635
Int. Cl.² A63B 71/02
U.S. Cl. 273—95 R **5 Claims**



1. In a game apparatus for directing a projectile toward a goal by manual manipulation of a shaft to engage and sling said projectile, said game apparatus being useable upon an unprepared playing field located on terrain of any configuration and consistency, the improvement comprising:

a. a plurality of non-aligned planar surfaces disposed upon said projectile for insuring that at least one of said planar surfaces is accessible to one end of said shaft while said projectile is at rest upon the playing field;

b. a cavity disposed within each of at least two of said planar surfaces for slidably receiving said one end of said shaft;

c. a laterally extending spur for engaging said shaft with one of said cavities; and

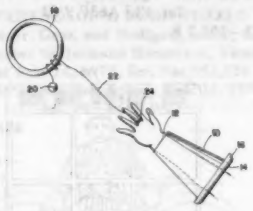
d. said goal being non-penetratingly positionable upon the playing field for rendering said goal useable upon any type of playing field terrain; whereby, said game apparatus is playable upon both natural and man made terrain without initial demarcation of a playing field.

3,970,308

RING, BALL AND CONE RETRIEVAL APPARATUS

Donald M. Christie, Toronto, Canada, assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Dec. 10, 1975, Ser. No. 639,253
Int. Cl.² A63B 71/02
U.S. Cl. 273—95 A **2 Claims**



1. A game device and set comprising main base means adapted for being held by a player, first throwable token member means constructed for being thrown into the air from said main base means, second throwable token member means constructed for being thrown into the air by a player of the game, said main base means comprising a truncated cone body, and a brim portion formed at the wider end of said cone body and extending therefrom for being grasped by the hand of the player, said first throwable token member means comprising an annular ring member of light weight material having an inside diameter less than the widest diameter of said cone body so that in rest position on said cone body it rests above said brim portion, said second throwable token member means comprising a spherical ball, retaining string means secured at one end to said ball for returning said ball after being thrown, and finger ring holding means at the other end of said string means for engaging with a finger of the player's hand to be retained for retrieving said ball.

3,970,309

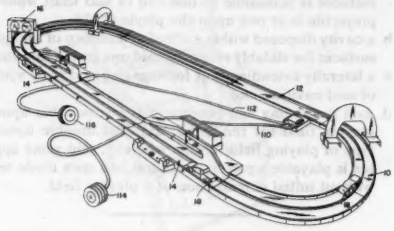
RACING GAME

Akihiro Sato, Tokyo, Japan, assignor to Tomy Kogyo Co., Inc., Tokyo, Japan

Filed Mar. 7, 1975, Ser. No. 556,403
Int. Cl.² A63F 9/14
U.S. Cl. 273—86 B **12 Claims**

6. A racing game, comprising vehicles, a continuous trackway comprising inner and outer substantially separate paths along which the vehicles race, means permitting the vehicles to travel faster in the outside path than in the inside path, switching means normally diverting the vehicles from the faster, outer path to the slower, inner path and retaining the

vehicles in the slower, inner path, and control means operative to actuate the switching means to divert the vehicles from the



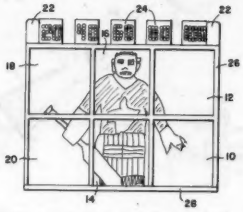
slower, inner path to the faster, outer path and to retain the vehicles in the faster, outer path.

3,970,310

ELECTRICAL TARGETS IRREGULARLY ILLUMINATED

Danny Gryschuk, Rexdale, Canada, assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Mar. 19, 1975, Ser. No. 559,682
Int. Cl.[2] A63F 9/02
U.S. Cl. 273—102.2 R 4 Claims



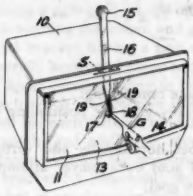
1. Game apparatus, which comprises:
a. a base;
b. a frame extending upwardly from said base, said frame having a back;
c. a plurality of front panels held in place by said frame;
d. a plurality of light means affixed to said frame for illumination of said panels;
e. one light spring disposed intermediate said back of said frame and each said front panel;
f. a ferrous plate affixed to an inside surface of each said front panel;
g. a plurality of electromagnets affixed to an inside surface of said back of said frame, one said ferrous plate aligned with each said electromagnet;
h. a plurality of stationery electrical contacts affixed to said inside surface of said back of said frame;
i. a spring electrical contact affixed to said inside of each said panel, each said spring contact aligned with one said stationery contact;
j. a battery means for powering said apparatus;
k. four contact wheels disposed in coaxial relationship on a common rod driven by means of a first pulley, belt, and a second pulley carried on a motor, each said contact wheel having separate contact points, said rod having four discrete rotor contacts, said rotor contacts in electrical contact respectively with said rotor wheels;
l. a plurality of brushes, each said brush respectively making contact with one said rotor contact causing selective illumination of one said light means upon rotation of one said contact wheel causing a closing of one of a plurality of switch means;
m. a goal light;
n. a buzzer, said goal light and said buzzer activated upon electrical contact between said stationery and said spring contacts;
o. each said contact wheel providing power to each said electromagnet holding stationery contact closed by supplying power through each said contact wheel, each said goal light, said buzzer and electromagnet wired in parallel;
p. a plurality of score lights wired in series to each said light means;
q. a plurality of sponge members, one said sponge member hitting one said panel at a time causing movement of said panel thereby causing electrical contact between one said stationery and one said spring electrical contact.

3,970,311

IMPACT GUN WITH PELLET POSITIONING LEVER

Raymond J. Lohr, 5043 Sterrettania Road, Erie, Pa. 16506

Filed Nov. 12, 1975, Ser. No. 631,105
Int. Cl.[2] A63F 9/02
U.S. Cl. 273—101 5 Claims



1. A target game comprising an enclosed container having a front wall,
said front wall comprising a resilient transparent sheet,
a rear wall on said container,
rotatable target means supported adjacent said rear wall, a pellet,
said pellet normally resting against said front wall adjacent the lower side thereof,
a top wall having an opening therethrough,
a lever,
said lever projecting through the opening in said top wall and being of sufficient length to extend down to the bottom of said container,
means on said lever for lifting and locating said pellet on the inner side of said front wall,
a gun means adapted to be supported against said front wall, opposite said pellet said gun means transmitting force through said front wall against said pellet, whereby said pellet can be projected toward said target upon firing said gun.

3,970,312

EDUCATIONAL GAME

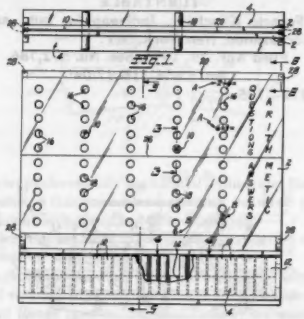
Herall G. Senn, 3815 War Memorial Drive 59B, Peoria, Ill. 61614

Filed July 14, 1975, Ser. No. 595,348
Int. Cl.[2] A63F 9/18
U.S. Cl. 273—130 A 5 Claims

1. An educational game apparatus comprising:
an upstanding game board and base means for holding the same in an upright position, said game board being defined by a pair of separable transparent panels, said panels being arranged in substantially face-to-face relation;
an opaque card removably positioned between said panels;
first and second groups of registering openings through said panels and card;

identical indicia means on each side of said card for each opening of said first group, each indicia constituting an incomplete statement of fact, the indicia at each opening being different from the indicia at any other opening;

identical indicia means on each side of said card for each opening of said second group, each constituting a completion of the incomplete statement of the indicia associated with one of the openings of said first group, the



indicia at each opening being different from the indicia at any other opening;

the indicia of said first group being arranged in predetermined order and the corresponding indicia of the second group being arranged in a different order; and

a plurality of pegs adapted to be selectively inserted through any of said aligned holes from either side of said game board.

3,970,313

ANCESTRAL EDUCATIONAL GAME APPARATUS

Ernest A. Montemayor, 4600 45th St. NW., Washington, D.C. 20016

Filed Oct. 31, 1974, Ser. No. 519,691
Int. Cl.² A63F 3/00
U.S. Cl. 273—134 AD **20 Claims**

1. Game apparatus for playing a game relating to and for educating players about genealogy, comprising in combination:

a. a playing board including an endless playing course having a plurality of serially connected playing spaces provided with indicia means for identifying respective spaces adapted to affect game play according to the indicia thereof; certain of said spaces having indicia means for identifying them generally as male and female ancestor spaces respectively;

b. a plurality of playing pieces for traversing said playing course by each player;

c. chance means operable by players in sequence for determining the number of spaces to be traversed per turn by a playing piece;

d. a genealogy type chart for each player, said charts each having horizontal parallel line indicia commencing at one side and disposed in a generally conventional ascending and descending step fashion, of which predetermined horizontal lines, subsequent to an initial single horizontal line at said one side, are vertically aligned to constitute a plurality of laterally adjacent successively preceding generation-recording means;

e. "Ancestor" card means including a deck of female ancestor cards and a deck of male ancestor cards, respectively bearing on one face thereof the name and other statistical indicia of female and male ancestors dating back over several hypothetical generations; said "Ancestor" cards adapted to be drawn during game play when a playing piece lands upon one of said ancestor spaces; and

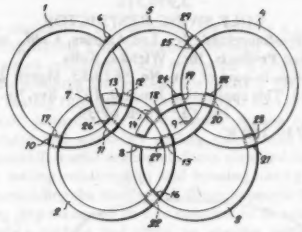
f. said "Ancestor" cards and said parallel line indicia of said genealogy chart having correlative indicia means for correlating said "Ancestor" cards and said parallel lines to thereby record on said chart ancestors of each given generation in a predetermined manner.

3,970,314

INTERENGAGING RINGS PUZZLE

Gert Michael Mayr, Graz, and Wolfgang Schöfl, Linz, both of Austria, assignors to Hermann Hansmann, Vienna, Austria

Filed Feb. 24, 1975, Ser. No. 552,128
Claims priority, application Austria, Feb. 25, 1974, 1490/74
Int. Cl.² A63F 9/12
U.S. Cl. 273—156 **5 Claims**



1. A puzzle comprising a plurality of rings of like width and diameter with substantially flat opposite faces, one of said rings being solid, each remaining ring being split by a peripheral slot accommodating said solid ring, each split ring being provided on each of said faces with at least one generally radial groove, said solid ring being provided with a generally radial groove for each split ring, oppositely facing grooves of different rings being interengageable for enabling assembly of said rings into an interfitting coplanar array with said solid ring passing through the slot of each split ring.

3,970,315

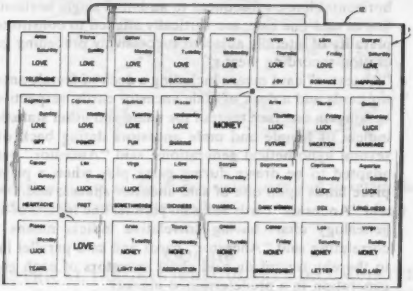
FORTUNE TELLING GAME

Sheldon Redner, New York, N.Y., assignor to Stephen Rothfeld, New York, N.Y.

Filed Jan. 24, 1975, Ser. No. 543,833
Int. Cl.³ A63F 9/18
U.S. Cl. 273—161 **5 Claims**

1. A fortune telling board game apparatus for determining astrological readings based on the twelve zodiac signs, said game being suitable for amusement and entertainment purposes and comprising astrology board means for defining a uniform pattern of zodiac stations with each station bearing

message intelligence, a plurality of accessory indexing cards, said cards being equal in number to the zodiac stations and adapted for compatible placement over each of the zodiac stations to conceal the message intelligence, selected indexing cards further containing identifying means for determining removal of cards from the board to expose message intelligence located on the respective zodiac stations, selected zodiac stations including identifying means, both identifying



means being in the form of the twelve zodiac signs with the cards for removal bearing the zodiac sign corresponding to the player's astrological sign, said indexing cards further including information means conjunctive with the message intelligence and identifying means on those exposed zodiac stations for complemenatry intelligence conveyance to facilitate self interpretation in calculating readings of personal advice and guidance.

3,970,316

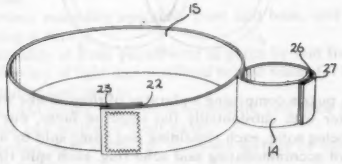
GOLF SWING RESTRICTOR

James P. Westmoreland, Jr., Los Angeles, Calif., assignor to Diversified Products, Inc., Wichita, Kans.

Continuation-in-part of Ser. No. 562,653, March 27, 1975, abandoned. This application June 30, 1975, Ser. No. 591,485

Int. Cl.² A63B *69/36*

U.S. Cl. 273—189 R **7 Claims**



1. An apparatus for controlling the swing of a golfer comprising:

an elongated, elastic chest encircling band for encircling a chest, said band including an inner surface for engaging such chest and an outer surface, and said band including fastening means for securing said chest encircling band about such chest; and

an elastic arm encircling band for encircling an arm, said arm encircling band including an inner surface for engaging such arm and an outer surface, said arm encircling band including fastening means for fastening said arm encircling band about such arm, said arm encircling band being directly joined to said chest encircling band such that a portion of said outer surface of said arm encircling band is in direct contact with a portion of said outer surface of said chest encircling band;

whereby the swing of a golfer is controlled and coordinated with the movement of the golfer's body since the upper portion of the golfer's arm is held by said arm encircling band adjacent to the golfer's chest.

3,970,317

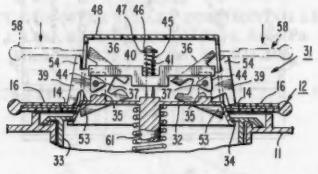
APPARATUS FOR INHIBITING A PLURALITY OF DISC RECORDS FROM BEING DISPOSED ON A TURNTABLE AND GROUNDING A DISC RECORD DISPOSED ON THE TURNTABLE

Thomas Francis Kirschner, Indianapolis, Ind., assignor to RCA Corporation, New York, N.Y.

Filed Apr. 29, 1975, Ser. No. 572,786

Int. Cl.² G11B *17/04*

U.S. Cl. 274—105 **5 Claims**



1. In a playback system for recovering prerecorded signals from a grooved region of a centrally apertured disc record, said record having an ungrooved region disposed between said grooved region and the walls of said aperture; said playback system including a rotatable turntable; apparatus for inhibiting a plurality of disc records from being disposed on said turntable comprising:

a spindle supported on said turntable in a central location;

a rotatable member mounted within said spindle, said rotatable member having a plurality of record-engaging means disposed about its periphery, each of said plurality of record-engaging means having mutually oppositely directed first and second record-engaging ends;

biasing means cooperating with said rotatable member to establish a rotational position of said member in the absence of encirclement of said spindle by record aperture walls, the position established by said cooperation being any one of a limited plurality of rotational positions; each of said limited plurality of rotational positions locating a respectively different one of said record-engaging means in a location protruding from the periphery of said spindle, with an orientation directing the first record-engaging end of the protruding record-engaging means away from the turntable, and placing the first record-engaging end of said protruding record-engaging means in the path of travel of a record to a position of centered engagement with said turntable;

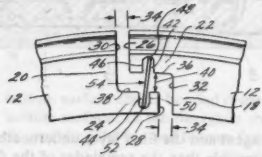
each of said record-engaging means being dimensioned so that passage of a record to a position of centered engagement with an otherwise unoccupied turntable results (1) initially in engagement of a turntable-facing surface of said passing record with the first recording-engaging end of the protruding record-engaging means, and (2) consequently in rotation of said member to a degree sufficient (*a*) to cause said biasing means to move the second record-engaging end of a record-engaging means adjacent to said protruding record-engaging means into engagement with a surface of said turntable-engaging record opposed to said turntable-facing surface, and (*b*) to intrude the first record-engaging end of said adjacent record-engaging means into said path to obstruct passage of any additional record to a position of centered engagement with the turntable-engaging record.

3,970,318

SEALING MEANS FOR A SEGMENTED RING

Eugene N. Tuley, Hamilton, Ohio, assignor to General Electric Company, Cincinnati, Ohio

Filed Sept. 26, 1975, Ser. No. 617,072
Int. Cl.[2] F01D 1/02, 9/00; F16J 9/16
U.S. Cl. 277—26 6 Claims



1. In a circumferentially segmented cylindrical flow confining apparatus, a fluidic seal arrangement between circumferential adjacent arcuate segments comprising:

a first circumferentially extending flange portion associated with one of said arcuate segments

a second circumferentially extending flange portion associated with an adjacent one of said arcuate segments, said second flange portion disposed radially outwardly and in overlapping spaced relationship with respect to said first flange portion so as to form a radial gap therebetween;

a first pocket in said first flange portion opening into said radial gap, said first pocket having a first radial end wall opposite said opening;

a second pocket in said second flange portion opening into said radial gap, said second pocket having a second radial end wall opposite said opening, said second pocket disposed radially outwardly and in a first overlapping spaced position with said first pocket,

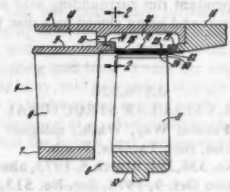
a radially extending seal member residing in each of said first and second pockets and extending radially across said gap, said seal member having a first position for sealing engagement with a first portion of each of said first and second radial end walls.

3,970,319

SEAL STRUCTURE

Charles D. Carroll, Greensburg, and George B. Meginnis, Indianapolis, both of Ind., assignors to General Motors Corporation, Detroit, Mich.

Division of Ser. No. 307,446, Nov. 17, 1972. This application May 3, 1974, Ser. No. 466,740
Int. Cl.[2] F16J 15/44
U.S. Cl. 277—53 4 Claims



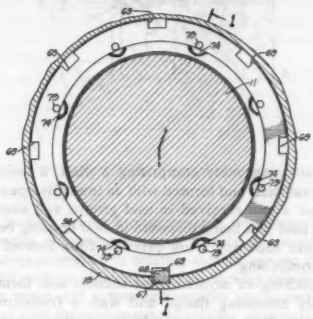
1. A porous abradable seal structure adapted to provide one element of a two element fluid-cooled seal with relative movement between the two elements, the structure having a contact surface adapted to cooperate with the other element of the seal and having a rear surface, the seal structure comprising a plural number of strips, each strip having two faces and having two edges, the strips being stacked face-to-face and bonded together, with the lengthwise direction of the seal strips extending generally in the direction of relative movement of the seal elements; the strips being so disposed that the faces of the strips extend from the said contact surface to the said rear surface of the seal structure and that the edges of the stacked strips define the said contact surface and the said rear surface, and a large proportion of the strips having grooves in and extending completely across at least one face of the strip between the opposite edges thereof, to define with an abutting strip pores for flow of a fluid through the seal structure from the rear surface to the contact surface.

3,970,320

MECHANICAL SEAL WITH THERMO-COOLING

Winfred J. Wiese, Whittier, Calif., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Apr. 28, 1975, Ser. No. 572,377
Int. Cl.[2] F16J 15/34
U.S. Cl. 277—74 4 Claims



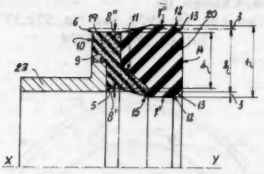
1. In a mechanical seal assembly for sealing a rotary shaft to a housing having a shaft opening through which the shaft extends, which mechanical seal comprises a rotatable sealing ring means mounted on the shaft for rotation therewith, said rotatable sealing ring means having limited movability axially of the shaft; nonrotatable or stationary sealing ring means; said rotatable and stationary sealing ring means having opposed, generally radial sealing surfaces disposed in relatively rotatable sealing relationship; said housing having a support flange surrounding the shaft which flange supports the stationary sealing ring means on its side opposite to its said generally radial sealing surface and along an annular surface spaced radially inward from its outer periphery; said flange and said stationary sealing ring means defining therebetween an annular cavity disposed radially outward from said annular surface; said stationary sealing ring means having a peripheral portion with a first generally radial annular surface contiguous to said cavity and exposed to pressure of fluid in said cavity, and a second generally radial surface on the opposite side of said peripheral portion exposed to the pressure of fluid within the housing, the improvement which comprises:

first fluid passage means extending through said stationary sealing ring means at the outer periphery thereof establishing fluid communication between said cavity and said housing and second fluid passage means through said stationary sealing ring means located radially inward in said first fluid passage means and also establishing fluid communication between said cavity and said housing, and second fluid passage means opening at its end adjacent to said rotatable sealing means at a location contiguous to said sealing surfaces whereby upon shaft rotation fluid flows from said housing through said first fluid passage means to said cavity and then through said second fluid passage means from said cavity to said housing, said fluid flowing through said second fluid passage providing cooling of said stationary sealing ring means and said sealing faces.

3,970,321
DYNAMIC-STATIC SHAFT SEAL

Jacques Dechavanne, 3 Boulevard de Jormadiere, Saint. Egreve, Isere, France

Filed Dec. 19, 1974, Ser. No. 534,164
Claims priority, application France, Dec. 19, 1973, 73.45529
Int. Cl.² F16J 15/24
U.S. Cl. 277—188 A 6 Claims



1. A sealing assembly comprising a shaft, a housing surrounding said shaft and formed with an inwardly open annular groove, and a seal received in said groove and surrounding said shaft, said seal being disposed in said housing between a high-pressure zone and a low-pressure zone formed therein, said seal comprising:

a cup packing of asymmetrical section and formed with radially extending flange and with a frustoconical lip extending from one axial side of said flange toward said high-pressure zone and having an inner face resiliently engageable with the outer surface of said shaft;

a supple pressure-distributing ring having an end surface bonded to said one side of said flange, an inner portion formed with a recess snugly receiving and bonded to the outer face of said lip, said recess having a frustoconical wall bonded to said outer face, a substantially cylindrical outer periphery resiliently engaging with and bottoming in the interior of said groove, and a substantially cylindrical inner periphery engaging said outer surface of said shaft, said lip having an inner face inclined inwardly toward said inner periphery and terminating flush therewith; and

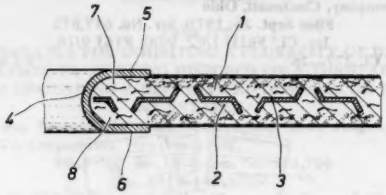
a nonresilient ring received in said packing at the other axial side thereof, said presssure-distributing ring retaining said packing out of engagement with the bottom of said groove and holding most of said lip out of engagement with said outer surface in the absence of a pressure differential across said zones.

3,970,322
CYLINDER HEAD GASKET FOR INTERNAL-COMBUSTION ENGINE

Friedhelm Stecher, Burscheid; Josef Fazekas, Wermelskirchen; Paul Jöhren, Dortmund-Horde, and Martin Morsbach, Hilgen, all of Germany, assignors to Goetzewerke-Friedrich Goetze AG, Burscheid, Germany

Filed Jan. 31, 1974, Ser. No. 438,356
Claims priority, application Germany, Jan. 31, 1973, 2304505
Int. Cl.² F16J 15/12
U.S. Cl. 277—235 A 5 Claims

1. Cylinder head gasket for internal-combustion engines comprising at least one fiber layer of a soft material having pores which are enriched with an impregnating agent to increase the cross-sectional density of the soft material and edges which are bordered by a casing wherein the fiber layer is impregnated only outside of the region of the casing so that the pores of said fiber layer underneath said casing are free of



impregnating agent and the fiber layer underneath said casing is more compressible than the remainder of the fiber layer.

3,970,323
CHUCK FOR DRILL

Albrecht Schnizler, Jr., Nurtingen, Germany, assignor to Metabowerke KG Closs, Rauch, & Schnitzler, Nurtingen, Germany

Filed Aug. 5, 1974, Ser. No. 494,912
Claims priority, application Germany, Aug. 17, 1973, 2341642
Int. Cl.² B23B 31/10, 31/24
U.S. Cl. 279—64 14 Claims

8. A drill chuck comprising; a chuck body adapted at one end for driving connection to a spindle, a clamping member rotatably supported on said body and having clamping jaws angularly displaceably mounted therein, rotation of said clamping member on said body actuating said jaws in opening and closing direction, a safety device for holding said clamping member in jaw closed position and including an element engageable with said clamping member, a spring bearing between said element and said body and biasing said element in a direction to urge said clamping member in clamping direction, and a cup-shaped housing rotatable on said body and having a dependent rim surrounding said safety device, said rim at the lower end being closed by a disc to which said element is pivoted.

3,970,324
FOAM-FILLED, CELLULAR STRUCTURAL PRODUCT

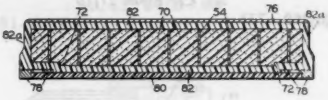
Eric F. Howat, Federal Way, Wash., assignor to American Marine Industries, Inc., Tacoma, Wash.

Division of Ser. No. 338,254, March 5, 1973, abandoned. This application Oct. 9, 1974, Ser. No. 513,412
Int. Cl.² A63C 5/00, 5/12; B32B 3/12
U.S. Cl. 280—610 2 Claims

1. A ski comprising in combination, body, tip and tail portions, the body portion being elongated and narrower in its central portion than at its ends and comprising

a. a cellular core comprising a multiplicity of tubular laterally closed cells of structural material arranged side-by-side with their axes substantially parallel to each other and their ends open, the tubular cells being of progressively increasing density from the wider to the narrower lateral dimensions,

b. a quantity of foamed plastic contained in the cells substantially filled the same and bonded to the walls thereof,
c. a fiberglass sheet resin-bonded to and encasing the core and the tip and tail portions, and



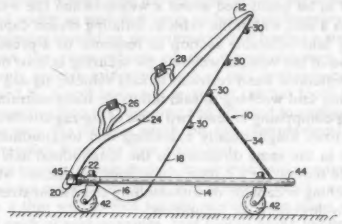
d. top and bottom surface sheets bonded respectively to the top and bottom surfaces of the fiberglass sheet, said surface sheets providing the top and bottom faces of the ski.

3,970,325

INFANT CREEPER

Ralph Wirsig, Kingston, Canada, assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed May 15, 1975, Ser. No. 577,663
Int. Cl.² B62B 7/04
U.S. Cl. 280—87.02 W **4 Claims**



1. A baby creeper adapted to move on a support surface comprising a contoured body including a first generally rearwardly inclined planar surface having disposed at a point generally at right angles thereto an elongated back support for support of the spinal column of a baby, said point of right angle formation being disposed at a minimum height such that there is substantially no contact with the support surface, a lip depending from said first generally planar surface; a chassis for elevation and support of said creeper and having a plurality of wheels disposed thereabout, said chassis including an elongated generally rectilinear bar on one side thereof, means for carrying said seat on said chassis, said means including said lip resting on said bar, said means further including at least two bars engaging said back support and said chassis to support said body and a plurality of discrete attachment points for selectively engaging said bars to vary the angle between said chassis and said body, said point of right angle formation being at least as low to said support surface as the chassis, said first surface being disposed at a relative height above said support surface such that the baby's feet communicate with said support surface.

3,970,326

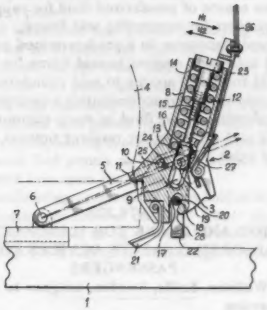
SAFETY SKI BINDING DEVICE

Georges Pierre Joseph Salomon, Annecy, France, assignor to S.A. Etablissements Francois Salomon & Fils, Annecy, France

Filed Jan. 15, 1975, Ser. No. 541,131
Claims priority, application France, Jan. 28, 1974, 74.2766
Int. Cl.² A63C 9/08
U.S. Cl. 280—626 **16 Claims**

1. A safety binding for a ski boot designed to retain one of the ends of the boot and comprising:

a. two lateral arms extending along each side of the boot and hinged at one end thereof, in relation to the ski, about a first pivoting means having a first pivoting axis parallel with the plane of the ski;
b. a retaining element, pivotally mounted in relation to a second pivoting means uniting the other ends of said lateral arms; said second pivoting means having a second pivoting axis parallel with the plane of the ski; said retaining element comprising jaw means for holding the boot and being actuated by a resilient element;



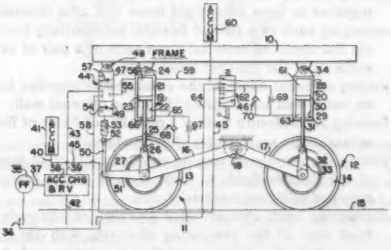
c. first locking means for temporarily interacting the three following elements: the boot, the lateral arms and the retaining elements, in relative motion against the action of said resilient element; said first locking means comprising a ramp and a stop temporarily interposed between two of said three elements in relative motion; and
d. second locking means for preventing temporarily said retaining element from pivoting, said second locking means comprising a ramp and a stop temporarily interposed between two of the following three elements in relative motion: the boot, the lateral arms and the releasing element.

3,970,327

SUSPENSION AND LOAD LEVELING FOR AN URBAN HAULER

Joseph E. Dezelan, Joliet, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed June 4, 1975, Ser. No. 583,365
Int. Cl.² B06G 17/00
U.S. Cl. 280—683 **8 Claims**



1. A suspension for a vehicle comprising the combinations of:

a vehicle frame;
first and second axles mounted in tandem beneath said frame;
means for separately, pivotally connecting said axles to said frame for pivotal movement toward and away from said frame;

first and second fluid controlled resilient means respectively connected between each of said first and second axles and said frame for resiliently supporting said frame by said axles;

means for communicating a fluid to said resilient means for maintaining a predetermined relative height of said frame above said axles and an equal distribution of weight on said axles.

said resilient means comprises a double-acting piston and cylinder assembly connecting each of said axles to said frame;

a common source of pressurized fluid for supplying fluid to said cylinders for supporting said frame;

valve means responsive to a predetermined position of one of said axles with respect to said frame for communicating fluid from said source to said cylinders; and,

accumulator means for accumulating a quantity of said fluid and maintaining said fluid in open communication with both of said cylinders for resilient support of said frame by said axles.

3,970,328

METHOD AND BLANK FOR MANUFACTURING SHOCK-ABSORBING SAFETY DEVICES FOR VEHICLE PASSENGERS

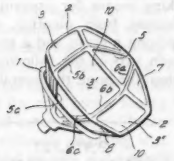
Hans Ivar Wallsten, Saffle, Sweden, assignor to AB Inventing, Saffle, Sweden

Filed July 19, 1973, Ser. No. 380,834

Claims priority, application Sweden, Feb. 12, 1973, 7301930

Int. Cl.² B60R *21/08*

U.S. Cl. 280—731 3 Claims



1. A method for manufacturing shock-absorbing safety devices for passengers in vehicles, comprising the steps of:

arranging a pair of sheets of a thin, flat, flexible, extensible and substantially gas tight material one upon the other;

joining the opposed longitudinal edges of the pair of sheets together to form a gas-tight inner wall of a channel;

arranging each of a pair of flexible, substantially inextensible flat sheets of material upon each of a pair of exterior surfaces of the channel inner wall;

joining adjacent edges of the outer sheets together to form an outer wall surrounding the inner channel wall;

forming an enclosure wall of a plurality of fields of flexible, substantially inextensible sheet material;

joining the outer wall around each channel to at least two of the flexible fields to form vertices at the boundaries between adjacent material fields;

connecting each channel of a plurality of channels to at least one of the remaining channels with their inner spaces being continuous and their respective sealed edges merging into and sealed to each other to form an enclosure expandable from a compact folded state to form a network of expandable and foldable channels connected to the enclosure wall; and

providing at least one gas receiving inlet communicating with the channel network for receiving a supply of compressed gas to cause the enclosure wall to assume a predetermined configuration.

3,970,329

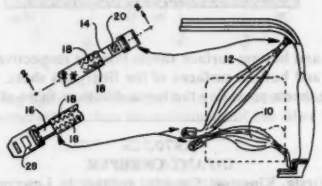
INFLATABLE BAND RESTRAINT STITCHING

Donald Joseph Lewis, Troy, Mich., assignor to Allied Chemical Corporation, Morris Township, N.J.

Continuation of Ser. No. 322,593, Jan. 10, 1973, abandoned. This application Nov. 26, 1974, Ser. No. 527,324

Int. Cl.² B60R *21/10*

U.S. Cl. 280—733 1 Claim



1. A vehicle safety system comprising an inflatable band restraint having an inflatable section with a longitudinal axis, said inflatable section being folded in an uninflated state and adapted to be positioned about a wearer when the wearer is seated in a seat within the vehicle; inflating means capable of inflating said inflatable section in response to a preselected condition of the vehicle; webbing for securing at least one end of said inflatable band restraint to said vehicle, zig-zag stitching joining said webbing to said inflatable band restraint, said stitching comprising at least two rows of zig-zag stitches, each of said rows longitudinally extending and longitudinally extendible in the same direction as the longitudinal axis of the inflatable section for a distance of at least two inches, whereby said stitching is capable of withstanding significant stress in at least two directions on inflatation.

3,970,330

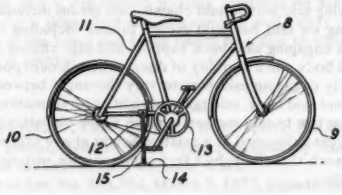
KICKSTAND BASE FOR TWO-WHEELED VEHICLES

Barry Norcross, West Hollywood, Calif., assignor to Larry K. Myers, Singapore, Singapore

Filed Sept. 20, 1974, Ser. No. 507,694

Int. Cl.² B62H *1/02*

U.S. Cl. 280—301 1 Claim

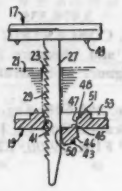


1. A support base for a vehicle having a pivoted or folding kickstand, the combination comprising a ground-contacting kickstand shank, a support base foot exceeding the contact area of the kickstand shank, said base foot having a faceted top defining a shallow hollow ground-contacting sole with reinforcing ribs extending across said hollow sole, a shank-receiving sleeve on the upper side of the foot having an entry axis at an angle to the ground-contacting sole of the base foot, said sleeve further having an inner wall making a removable friction fit with the outer wall of the shank.

3,970,331
BINDER ELEMENT

Joe D. Giulie, Los Altos Hills, Calif., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation-in-part of Ser. No. 388,246, Aug. 13, 1973, abandoned. This application May 12, 1975, Ser. No. 576,787
Int. Cl.² B42D *1/00*
U.S. Cl. 281—21 R 10 Claims

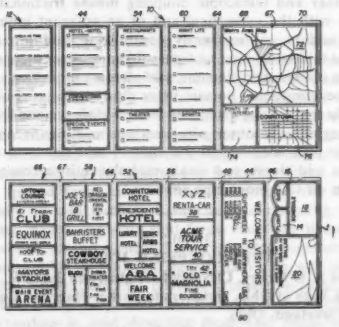


1. A binder element for an apertured book or the like, comprising in combination:
   a. a first strip having a plurality of spaced studs extending therefrom, said studs having a plurality of ratchet teeth on at least one edge thereof,
   b. a second mating strip having substantially the same length and width as said first strip with complementary spaced openings extending therethrough and having a size larger than the cross-section of the complementary stud to freely receive said stud, each of said openings being defined by a wall having at least one ratchet tooth thereon extending into said opening and adapted to engage in said opening the ratchet teeth on the complementary stud extending from the first strip, and
   c. locking means adapted to move into said openings, said locking means consisting of a series of blocks each held by a thin web to said second mating strip along an edge of each of said openings, said blocks being located to be forced directly into said openings for holding said ratchet teeth of the two strips in engagement with each other.

3,970,332
AIRLINE TICKET AND INFORMATION FOLDER

Lauritz Lauritzen Alford, Jr., Dallas, Tex., assignor to Ad-One, Inc., Dallas, Tex.

Filed Nov. 14, 1974, Ser. No. 523,906
Int. Cl.² B42D *15/00*
U.S. Cl. 281—31 11 Claims

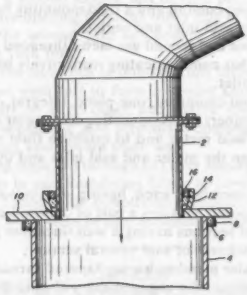


1. An airplane ticket and information folder for use by an airplane passenger comprising:
   a rectangular pocket portion formed by a pair of flexible paper sheets to enable the insertion of tickets and boarding passes therein,
   a first paper panel integrally joined by a first paper fold to one edge of said pocket portion and including a first type of travel information regarding the destination of the passenger,
   a plurality of additional paper fold panels, said panels having a first edge and a second edge opposite said first edge, the first panel of said additional paper fold panels being connected along its first edge by a fold to the edge of said first fold panel opposite said first fold with the remaining said fold panels being connected with the first edge of each said panel connected by a fold to the second side of an adjacent panel,
   ones of said additional fold panels displaying on the back sides thereof advertisements regarding the travel information contained on the front side of the fold panel once removed from the panel adjacent thereto, such that said fold panels may be folded to place said advertisements on the back of said fold panels in a side-by-side relationship adjacent corresponding types of travel information on the front of said fold panels as said fold panels are sequentially folded one upon the other,
   said fold panels being constructed to be folded beneath said pocket portion to form a compact folder for carrying, while being operable to be unfolded when the passenger desires to review travel information regarding the destination.

3,970,333
EXTENSION COMPENSATION AND EXPLOSION PROTECTION DEVICE

Franz Pelzer, Kirchheim, Germany, assignor to Dravo Corporation, Pittsburgh, Pa.

Filed Oct. 10, 1975, Ser. No. 621,461
Claims priority, application Germany, Oct. 16, 1974, 2449159
Int. Cl.² F16L *55/00*
U.S. Cl. 285—9 R 4 Claims



1. Extension compensation and explosion protection device for pipelines for gaseous media, comprising:
   upper and lower concentric conduit members, disposed on a common vertical axis, with the upper conduit member having a diameter less than the diameter of the lower conduit member;
   a support ring attached to the outside of the lower conduit member;
   a first flexible, ring-shaped seal supported by the support ring;
   an annular plate supported by the first flexible seal and surrounding the lower end of the upper conduit member, having an inside diameter greater than the outside diameter of the upper conduit member, and an outside diameter greater than the outside diameter of the first flexible seal;

a circular restraining member attached to the upper surface of the annular plate;

a second flexible, ring-shaped seal disposed between and contacting both the upper conduit member and the circular restraining member; and

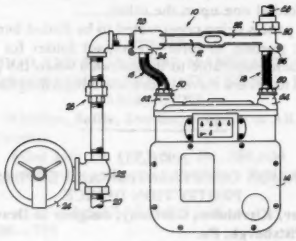
a load ring, supported by the second flexible seal, and urging the second flexible seal into sealing contact with both the upper conduit member and the circular restraining member.

3,970,334

CONNECTORS FOR COUPLING METERS WITH METER BARS

Max L. Campbell, Topeka, Kans., assignor to Hydro-Flex Corporation, Inc., Topeka, Kans.

Filed Mar. 14, 1975, Ser. No. 558,229
Int. Cl.² F16L 3/22, 51/02
U.S. Cl. 285—30 1 Claim



1. In a gas meter installation assembly, the combination comprising;

a gas volume meter of specific weight and having a gas entry and a gas exit:

a meter bar adapted for mountng on a support and including an inlet adapted to interconnect with a gas source, an outlet spaced from said inlet for interconnection with a gas-delivering conduit and a rigid mounting beam extending between said inlet and outlet,

there being first and second gas meter threaded ports within said meter bar communicating respectively with said inlet and said outlet;

first and second elongated, one-piece, integral, open-ended, tubular members interconnecting said meter and said bar to support said meter and to establish fluid communication between the meter and said inlet and outlet respectively,

said tubular members each having a thin-walled central section disposed between a pair of opposed end sections, each of said sections having a wall thickness greater than the wall thickness of said central section;

said first tubular member having tapered threads on one of said end sections for engagement with said threads of the first meter port, and a shoulder on the other of said end sections for sealing against said gas entry on said meter;

said second tubular member having tapered threads on one of said end sections for engagement with said threads of the second meter port, and a shoulder on the other of said end sections for sealing against said gas exit on said meter;

nut members clamping said shoulder of each said tubular member in sealing engagement, with said meter;

each of said central sections containing a plurality of interconnected, axially aligned, annular corrugations along the length thereof operable to permit longitudinal and transverse flexure of said members yet preclude significant radial deformation of the same,

the internal diameter of said corrugations being substantially equal to the internal diameter of said end sections and the external diameter of said corrugations being substantially equal to the external diameter of said end sections;

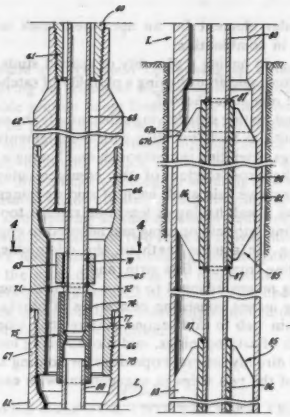
said central sections having a wall thickness sufficient to provide a limited degree of rigidity of said flexible members such that the weight of said meter is supported without deformation of the members and further confines flexure and shock absorbing action to the central sections.

3,970,335

DUAL CONCENTRIC PIPES

Alfred R. Curington, and Theodore J. Roscoe, Jr., both of Houston, Tex., assignors to Bakerdrill, Inc., Spartanburg, S.C.

Division of Ser. No. 392,628, Aug. 29, 1973, Pat. No. 3,871,486. This application Oct. 24, 1974, Ser. No. 517,541
Int. Cl.² F16L 39/00; E21B 1/06
U.S. Cl. 285—133 A 9 Claims



1. A dual concentric drill pipe for continuously taking core samples from the bottom of a bore hole while drilling progresses; comprising inner and outer pipe sections defining an annular space therebetween, said outer pipe section having opposite ends provided with tool joints adapted to be connected to adjacent corresponding outer pipe sections, said inner pipe section having at one end a cylindrical section and at the other end telescopic coupling means frictionally engageable with the cylindrical end of an adjacent inner pipe section, and means resiliently centralizing said inner pipe section in said outer pipe section; said centralizer means comprising an elastomeric element, said element including a cylindrical sleeve mounted on said inner pipe section and circumferentially spaced ribs extending from said sleeve and frictionally engaging said outer pipe section, and means engaging said inner pipe section and the ends of said sleeve to axially compress said sleeve and retain said sleeve in a compressed condition on said inner pipe section.

3,970,336

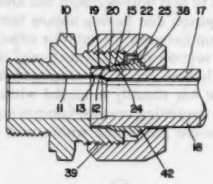
TUBE COUPLING JOINT

Lawrence B. O'Sickey, Cleveland Heights, and Jerry V. Koski, Parma, both of Ohio, assignors to Parker-Hannifin Corporation, Cleveland, Ohio

Filed Nov. 25, 1974, Ser. No. 526,701
Int. Cl.² F16L 19/08
U.S. Cl. 285—341 3 Claims

1. A tube coupling joint comprising a body having an internal cam surface leading to a bore, a tube of predetermined outside diameter having an expanded terminal end portion in

said bore and engaging a shoulder on said body, said end portion being of larger outside diameter than the predetermined diameter and being unsupported along its inside surface, a sleeve over said tube, said sleeve having a radially contracted forward portion whose inner diameter is less than said predetermined diameter whereby said contracted portion grips the tube immediately adjacent said expanded portion, said cam surface engaging said sleeve contracted portion to



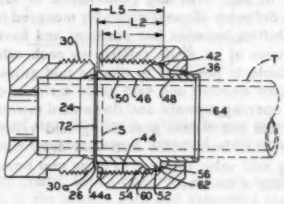
maintain the same in said contracted position, and a thrust member interengaged with said body and axially engaging the sleeve to maintain said sleeve contracted portion in engagement with said cam surface and said end portion in engagement with said shoulder, the inside and outside surfaces of said expanded end portion being substantially cylindrical and said outside surface is of greater diameter than the initial internal diameter of said sleeve contracted portion before contraction of the same.

3,970,337

CONDUIT COUPLING STRUCTURE

Robert W. Niemeyer, Avon Lake, Ohio, assignor to Alco Standard Corporation, Valley Forge, Pa.

Filed Feb. 18, 1975, Ser. No. 550,474
Int. Cl.² F16L *19/08*
U.S. Cl. 285—342 **7 Claims**



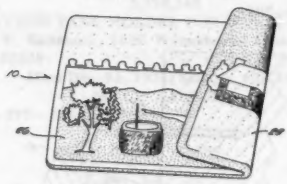
1. In a tube coupling device of the character including first and second coupling members having cooperably interengageable means for connecting the members together, an annular sleeve receiving the tube and having a contractible end portion, said first coupling member having a tube receiving bore and an annular cam wall extending radially and axially outwardly from said bore and receiving said contractible end portion of said sleeve, said sleeve including force receiving means spaced from said contractible end in the direction outwardly of said bore, and said second coupling member including means engaging said force receiving means when said first and second members are connected together forcing said contractible end portion against said cam wall and camming the contractible end portion against the tube, the improvement comprising: said sleeve having a second end portion extending in said direction from said force receiving means and having an end face spaced from said force receiving means in said direction, said cam wall having an axially outer edge having a given diameter, said first coupling member further including means defining a radial abutment surface facing in said direction and having an annular inner edge the diameter of which is at least equal to said given diameter, at least said end face of said second end portion of said sleeve having a diameter greater than said given diameter, whereby said end face abuts against said abutment surface when said sleeve is received on said tube with said second end portion facing said bore, and said sleeve having a length between said end face and said force receiving means, said length axially spacing said cooperably interengageable means on said first and second coupling members against interconnection when said end face abuts said abutment surface and said means on said second coupling member engages said force receiving means.

3,970,338

METHOD OF MAKING REVERSIBLE HOOKED ARTICLES

Lloyd L. Crowe, Milwaukee, Wis., assignor to Shirley L. Depke, Milwaukee, Wis.

Filed June 2, 1975, Ser. No. 583,088
Int. Cl.² B65H *69/04*
U.S. Cl. 289—1.5 **13 Claims**



1. A method of making reversible hooked articles on a base comprising a foundation fabric having crossed strands with openings between adjacent crossed strands, comprising the steps of:

a. pulling a first looped tuft of yarn part way through one of said openings from one side of said foundation fabric;
b. pulling a second looped tuft of yarn part way through a proximate opening from the other side of said foundation fabric, the second yarn tuft passing through the loop of the first yarn tuft;
c. pulling the free ends of one yarn tuft through the loop of the other yarn tuft to form a square knot securing said yarn tufts to each other and to the foundation fabric strands separating said proximate openings;
d. tightening said square knot; and
e. repeating steps (a) through (d) over successive proximate openings in said foundation fabric to cover both surfaces of said fabric with symetrically disposed tufts to form piles on both sides of said foundation fabric.

3,970,339

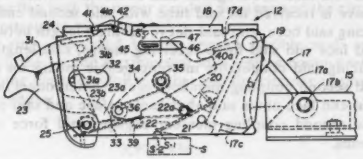
DOUBLE SWINGING LATCHBOLT

Philip H. Haselton, Short Hills, and Frederick W. Geils, Fair Lawn, both of N.J., assignors to Detex Corporation, New York, N.Y.

Filed Jan. 15, 1975, Ser. No. 541,080
Int. Cl.² E05C *3/22*
U.S. Cl. 292—227 **14 Claims**

1. A latchbolt assembly for mounting on a door hinged to a door frame carrying a complementary latch keeper, comprising a housing for the assembly, a movable lachbolt mounted in the housing for swinging movement in both clockwise and counterclockwise directions from a centralized latching position and in which the axes of the hinged door and of the swinging movement of the latchbolt are substantially parallel, and releasable deadlatch means to secure the latchbolt against swinging movement in either direction when it is disposed in its centralized position in the latch keeper to secure

the door shut in its frame, whereby the swinging movement of the latchbolt in one direction frees the latchbolt from the



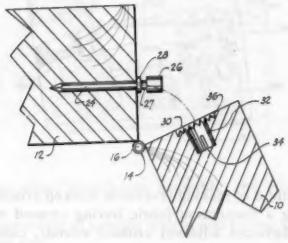
keeper and the swinging movement in the other direction admits the latchbolt into the keeper as the door is shut.

3,970,340

HINGE PIN LOCKS

Kenneth E. Taft, Stuart, Fla., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed June 19, 1975, Ser. No. 588,476
Int. Cl.² E05C *19/00*
U.S. Cl. 292—300 **9 Claims**



1. A hinge pin-lock comprising an elongated member and a sleeve member having one end blocked and adapted to releasably receive a portion of said elongated member, said elongated member defining a shaft terminating at one end in an enlarged annular head, said shaft defining a second head, said second head being disposed on shaft forward of said first head, said sleeve member having a depth about equal to the distance on said shaft from head to head and defining a substantially toroidal base portion, a side of said base portion being elongated and defining a substantially conically shaped protrusion, said base member being operative to slidably engage a portion of said elongated member, the distal end of said head adapted to abut said closed end of said sleeve whereby movement of said member is arrested.

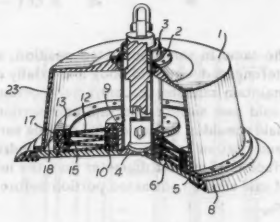
3,970,341

VACUUM LIFTING UNIT INCLUDING A SUCTION CUP

Rudolf Glanemann, and Wolfgang Schlaupitz, both of Greven, Germany, assignors to Vacu-Lift Maschinenbau GmbH, Emsdetten, Germany

Filed Nov. 27, 1974, Ser. No. 527,890
Claims priority, application Germany, Dec. 12, 1973, 2360575
Int. Cl.² B66C *1/02*
U.S. Cl. 294—64 R **1 Claim**

1. A vacuum lifting unit comprising a frame including an upper cover housing portion having a center opening, a hollow piston rod slidable in said center opening having its upper end connected to said frame, a piston disc connected to the lower end of said hollow piston rod, a suction disc connected to said housing cover portion and having a central aperture adapted to be selectively covered by said piston disc when the latter is lowered into its lowermost position, an encircling contacting gasket on said suction disc, a series of annular diaphragm sheets disposed in said housing cover portion having hollow central portions through which extends said piston rod, means connecting the lower one of said diaphragm sheets to said suction disc, means connecting the upper one of said diaphragm sheets to said hollow piston for movement therewith, said diaphragm sheets being extendable to form a bellows with lifting of said piston rod, said diaphragm sheets being in fluid communication with said suction disk through said aperture and providing an increased volume of rarified atmosphere with upward travel of said hollow piston rod and expansion of said bellows, said piston disc having hollow bores therein for fluid communication between the interior of said hollow piston rod and said suction disc, a selectively operable valve means within said hollow piston for closing said bores in said piston disc, a draw bar slidably mounted within said hollow piston, said valve switching means comprising a vertically movable valve element positioned within said hollow piston



for selectively opening and closing said bore holes in said piston disc, an upstanding guide plate fixedly attached to said valve element, said guide plate having a polygonal-shaped opening with a pair of guide surfaces thereon converging in the direction of the axis of the piston rod, a strut suspended at its upper end on said draw bar, a pin means formed on the lower end of said strut and positionable in said polygonal opening, a deflector element pivotably mounted on said guide plate for shifting between two positions and having a pair of guide surfaces at an angle relative to each other, said pin means slidable to positions to engage said guide surfaces of said deflector element and said guide surfaces defining said polygonal opening, upward and downward movement of said strut and said pin means positioning said valve element to leave open said bore holes with said draw bar raised and positioning said valve element to close said bore holes when said draw bar is lowered.

3,970,342

TIRE SERVICING APPARATUS

Larry G. Cotton, Clear Lake, Iowa, assignor to Iowa Mold Tooling Co., Inc., Garner, Iowa

Filed June 6, 1975, Ser. No. 584,588
Int. Cl.² B66C *1/16*
U.S. Cl. 294—86 R **8 Claims**

1. Tire servicing apparatus comprising,

a tire gripping tool base adapted to be mounted on a vehicle, a crane boom, or the like;

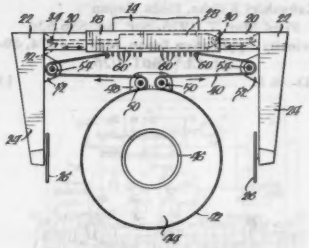
a pair of opposed tire gripping members movably mounted on said base for movement towards and away from each other whereby a tire may be gripped or released for servicing purposes;

motor means for moving said tire gripping members towards and away from each other; and

an elongated, flexible strap operatively connected to both said tire gripping members, said strap having a length sufficient to define a loop of sufficient size to be circumferentially received about a tire;

whereby when said loop is circumferentially disposed about a tire, said motor means may be operated to move said

tire gripping members away from each other to diminish the size of said loop thereby squeezing the tire about its tread to seat the beads of the tire on a rim associated therewith.



3,970,343

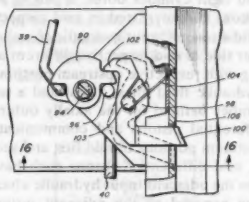
SUNROOF STRUCTURE

Charles G. Horn, West Newton, Mass., assignor to Aro Manufacturing Co., Inc., West Newton, Mass.

Filed Sept. 16, 1974, Ser. No. 506,736

Int. Cl.² B60J 7/04

U.S. Cl. 296—137 E **12 Claims**



1. A sunroof structure for a vehicle having a roof opening beneath which the structure is disposed, said structure comprising;

a yieldable plastic frame covering an area larger than the opening in the vehicle roof and extending rearwardly of the roof opening, said frame having a cross-sectional configuration defining guide channels extending rearwardly along at least the sides of the frame,

a sunroof panel slidable within the frame and having means attached thereto for facilitating forward and rearward movement of the sunroof panel,

means disposed in each guide channel and each including a lifter bar upon which the panel rests, means defining a pivot for the bar at one end, and means for lifting the other end of the lifter bar,

said lifting means comprising a link pivoted at one end from the lifter bar,

and means for actuating the lifting means including a rod means extending along the guide channels and means coupling the rod means to an other end of the link to cause the lifter bar to pivot upwardly and urge the sunroof panel against the roof to cover the opening.

12. For a sunroof structure for a vehicle wherein the structure has lifter assemblies at opposite sides for sealing a sunroof against the vehicle roof, an apparatus for securing and unsecuring the sunroof to permit the sunroof to be either in a sealed closed position or slideable to an open position, said apparatus comprising,

a handle,

means coupled from and operable by the handle for operating the lifter assemblies,

cam means operable by the handle to permit only limited rotation of the handle,

latch means engagable with the cam means and having integral therewith a sunroof engaging edge for rotating said latch means when the sunroof is closed to permit rotation of the cam means,

biasing means and a means for supporting the biasing means independent of the latch means,

said cam means including means for receiving said latch means to maintain said cam means non-rotatable unless the sunroof is closed,

said biasing means for biasing the latch means to a position wherein the cam means is non-rotatable until the sunroof directly contacts the engaging edge of the latch means,

said latch means being rotatable against the bias of the biasing means upon direct engagement of the sunroof with the engaging edge of the latch means to thereby permit rotation of the cam means.

3,970,344

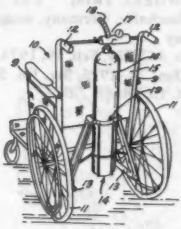
OXYGEN TANK HOLDER FOR WHEELCHAIRS

Arthur V. Baumann, 1410 Wynneburne Drive, Cincinnati, Ohio 45238

Filed Dec. 11, 1975, Ser. No. 639,833

Int. Cl.² A47C 7/62

U.S. Cl. 297—189 **3 Claims**



1. An oxygen tank holder for attachment to most foldable wheelchairs that have a pair of rearwardly extending foot levers, comprising a circular strap, a pair of depending struts of equal lengths, each having its upper end pivotally mounted on opposite sides of the strap, a sleeve bearing on the lower end of each strut adapted to detachably receive a foot lever of a wheelchair, a wire basket depending from the circular strap between the struts and adapted to receive the lower end portion of an oxygen tank, flexible cable means each connected to a mid-portion of the basket on opposite sides thereof, and an adjustable lock means on each strut and engagable with the terminal end portion of a flexible cable means.

3,970,345

CYCLE SEAT WITH ACCESSORY-BEARING ATTACHMENTS

Stephen A. Holcomb, 1369 N. Los Robles, Pasadena, Calif. 91104

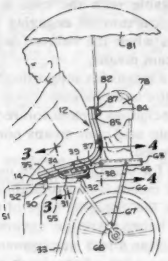
Filed July 11, 1975, Ser. No. 595,071

Int. Cl.² B62J 1/00

U.S. Cl. 297—195 **11 Claims**

1. A rider's cycle seat for adjustable attachment to a conventional cycle seat frame having a front yoke and a rear frame member, and comprising a seat base, a backrest at an angle to the seat base, a horizontal retainer strip on the seat base adapted to movably retain the seat base with respect to the front yoke on the cycle seat frame, a slide bar attached at each side of the seat frame, transversely spaced longitudinal

racks on the seat base, a removable lock bar adapted to extend through the racks and the slide bars so as to adjust the seat



base and backrest longitudinally of the cycle, means for securing the front of the seat to the cycle frame, and means on the seat for securing a load to the seat other than the rider.

3,970,346

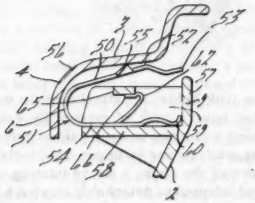
FASTENING ARRANGEMENT FOR DECORATIVE WHEEL TRIM

Paul Kretschmer, Waldaschaffe, Germany, assignor to Ymos-Mettalwerke, Germany

Continuation of Ser. No. 443,520, Feb. 19, 1974, abandoned. This application Jan. 24, 1975, Ser. No. 543,971

Int. Cl.[2] B60B 7/00

U.S. Cl. 301—37 R **9 Claims**



1. In a fastening means for securing a decorative cover on the outer face of a vehicle wheel which has an outwardly diverging annular flange, said fastening means embodying an inwardly extending axial flange on said cover adapted to be aligned with and spaced from said wheel flange when the cover is applied to the wheel, means defining a plurality of spaced clip receiving recesses on said cover flange, each said recess being defined by an outer end wall and a pair of spaced side walls extending inwardly therefrom forming a recess which is open at its inner end, a bridge member having a plurality of walls engaging the side walls of the recess and spaced inwardly from the end wall providing an opening therebetween, a metal spring clip disposed within each of said recesses having a locking portion engaging the bottom of the recess and a wall of said bridge member with a lanced out finger extending into the opening having its end engaging the adjacent end of the bridge member to secure the locking portion of the clip within the recess with an end-to-end non-yielding abutment, and securing means supported by said locking portion for engagement with said wheel flange.

3,970,347

FLUID PRESSURE CONTROL DEVICE WITH A FAILURE ALARM FOR A VEHICLE BRAKE SYSTEM

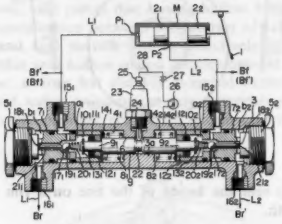
Mitsutoyo Mizusawa, Kawanishi, Japan, assignor to Nisshin Kogyo Kabushiki Kaisha, Ueda, Japan

Filed Mar. 7, 1975, Ser. No. 556,536

Claims priority, application Japan, May 2, 1974, 49-49386

Int. Cl.[2] B60T 8/26

U.S. Cl. 303—6 C **11 Claims**



1. In a vehicle brake system of the type including a dual brake master cylinder having a first and a second independent output port and a first and a second hydraulic fluid line extending from said respective first and second output ports of said brake master cylinder and connected to the respective hydraulic fluid chambers of a pair of left and right front wheel brakes, a fluid pressure control device with a failure alarm comprising: a casing arranged across said first and second hydraulic fluid lines midway thereof and defining a pair of aligned left and right cylinder bores, a pair of left and right differential pistons slidably fitted in said respective cylinder bores, a first and a second input hydraulic chamber defined on the axially inner side of said respective differential pistons and communicating with respective upstream portions of said first and second hydraulic fluid lines, a first and a second output hydraulic chamber defined on the axially outer side of said respective differential pistons and communicating with respective downstream portions of said first and second hydraulic fluid lines, said differential pistons each having one end face exposed to the adjacent input hydraulic chamber and the other end face exposed to the adjacent output hydraulic chamber and larger in area than said one end face, a fluid control valve provided for fluid communication between each of said input hydraulic chambers and the adjacent output hydraulic chamber, means secured to said casing for opening each said fluid control valve upon axial movement to the outermost position of the associated differential piston and to close said valve upon axially inward movement thereof, a balance piston slidably fitted at the opposite ends in said first and second input hydraulic chambers and slidable from a neutral position under a pressure differential occurring between said input hydraulic chambers, and a switch unit operable in response to the sliding movement of said balance piston from the neutral position to actuate an external alarm.

3,970,348

ELECTRICAL CONTROL SYSTEM FOR PNEUMATIC BRAKES

Arthur Maskery, London, England, assignor to Westinghouse Brake & Signal Co. Ltd., England

Filed Feb. 10, 1975, Ser. No. 548,801

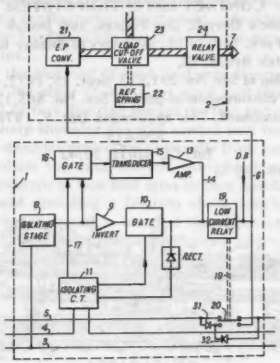
Claims priority, application United Kingdom, Feb. 14, 1974, 6811/74

Int. Cl.[2] B60T 8/20

U.S. Cl. 303—22 R **10 Claims**

1. Brake control apparatus for a vehicle braking system which generates a brake control signal for controlling the vehicle brakes, said apparatus comprising a control signal input, an a.c. signal input, gating means responsive to a variable mark to space ratio signal when applied at the control

signal input for gating portions of an a.c. signal when such an a.c. signal is supplied at the said a.c. input and means responsive to the output of the gating means for controlling the magnitude of the brake control signal in dependence upon said mark to space ratio.

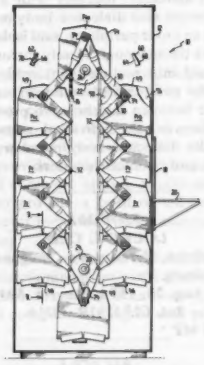


3,970,349

GRAVITY STABILIZED INTERNESTING CARRIER SYSTEM FOR MECHANIZED FILING AND STORAGE CABINETS

Algis R. Banys, Reno, Ohio, assignor to Sperry Rand Corporation, New York, N.Y.

Continuation of Ser. No. 466,823, May 3, 1974, abandoned.
This application June 30, 1975, Ser. No. 591,855
Int. Cl.² A47B *49/00*
U.S. Cl. 312—268 **20 Claims**



1. An interesting carrier pan assembly comprising:

a plurality of carrier pans for holding and storing items;

an endless conveyor, said endless conveyor comprising a flexible endless member riding on, and extending between, at least two wheels, and suspension arms for suspending said carrier pans from said flexible endless member but for allowing said carrier pans freedom of rotation about suspension points, said flexible endless member and said suspension arms holding each of said carrier pans in contact with an adjacent carrier pan while transporting it along a straight, substantially vertical path but holding each of said carrier pans out of contact with adjacent carrier pans while transporting it along curved paths about said wheels;

wherein each of said carrier pans includes an end member having an upper camming surface on the top side thereof, a lower camming surface, complementary to said upper camming surface, on the lower side thereof, for meshing with said upper camming surface of an adjacent carrier pan when said endless conveyor moves these carrier pans into contact with one another to cause a previously free one of said carrier pans to assume a desired attitude relative to the other of these carrier pans; and,

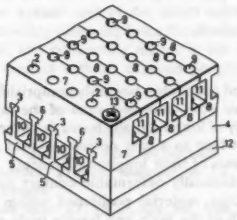
a stationary camming means for allowing said carrier pans to freely rotate about said suspension points and thereby achieve attitudes as are determined by weight distributions in said carrier pans while said carrier pans are being transported along said curved paths but for contacting said carrier pans toward the end of at least one of said curved paths for correcting the rotational orientations of said carrier pans prior to their making contact with respective adjacent carrier pans by rotating the carrier pans back to acceptable angular positions only if they are tilted beyond predetermined degrees.

3,970,350

MATRIX PIN BOARD

Tooru Takahashi, Yokohama, Japan, assignor to Yamaichi Denki Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed June 23, 1975, Ser. No. 589,773
Claims priority, application Japan, June 27, 1974, 49-75656
Int. Cl.² H01R *25/02*, *9/22*
U.S. Cl. 339—18 P **3 Claims**



1. A matrix pin board comprising a plurality of transversely extending I-shaped elements having a bottom flange slightly wider than the top flange and having a plurality of semicircular recessed spaced at intervals along the edges thereof, said transversely extending I-shaped elements being side by side with the bottom flanges abutting to define holes at the recesses therein, a plurality of longitudinally extending I-shaped elements having a bottom flange slightly thicker than the top flange and each flange having a plurality of semicircular recesses spaced at intervals along the edges thereof, said bottom flange having a plurality of T-shaped transverse recesses therein at spaced intervals therealong, said longitudinally extending I-shaped elements being side by side with the flanges abutting to define longitudinally extending channels therebetween and holes at the recesses therein, and the top flanges on the transversely extending I-shaped elements extending through the T-shaped recesses in the bottom flanges of said longitudinally extending elements, the transversely extending I-shaped elements and the bottom flanges of said longitudinally extending I-shaped elements defining transversely extending channels therebetween, the holes defined by the flanges of said elements being aligned in vertical lines extending through said channels, means for holding said elements in engage relationship, conductor elements extending along said channels having holes therethrough aligned with said vertically aligned holes and individual contact portions adjacent each of said holes, and terminal means electrically connected to each of said conductor elements and extending

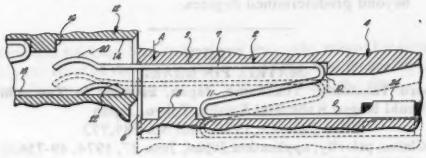
to a point outside of said board, whereby pin elements can be inserted into the aligned holes for electrically connecting the conductor element in one transversely extending channel with the conductor element in one of the longitudinally extending channels.

3,970,351

ELECTRICAL CONNECTOR AND CONTACT STRIP THEREFOR

Robert Allen Hollingsead, Yorba Linda, and Clyde Robert Pryor, Anaheim, both of Calif., assignors to Hollingsead-Pryor Enterprises, Inc., Sante Fe Springs, Calif.

Filed Dec. 23, 1974, Ser. No. 535,307
Int. Cl.² H01R 25/04
U.S. Cl. 339—49 R **7 Claims**



1. An electrical connector assembly comprising: a male and female connector body member, each of the body members having a plurality of longitudinally bores therethrough extending from a front face to a rear portion thereof and movable traverse to the axis of their longitudinal bores;

an identical elastically deformable contact strip of a solid flat conductive material positioned within at least one bore in each of the male and female body members, the contact strip being formed generally in a Z-shape and consisting of a diagonally intermediate section and a pair of parallel leg sections extending in each direction from the diagonal intermediate section, the respective parallel leg sections are connected to the intermediate section by curved bends, and one end of each leg section terminates in a contact portion, the contact strips are contracted during insertion into the respective bores;

first stop means located within the bores in each male body member to position the contact strip therein with a contact portion of the strip extending beyond the face of the body member and to prevent longitudinal movement of the contact strip in each direction within the bore when the contact strip is in its expanded condition, the respective parallel leg sections extending along opposite surfaces of the male bore with the diagonal intermediate section extending between the parallel leg sections and across the bore; and

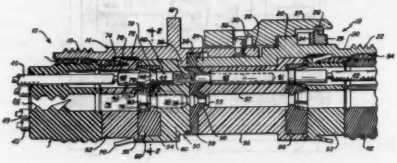
second stop means located within the bores in each female body member to position the contact strip therein so that the leg section extending forward towards the face of the female body member and its contact portion remains within the respective bore and prevents longitudinal movement of the contact strip within the bore when the contact strip is in its expanded condition, the respective parallel leg sections extending along the opposite surfaces of the female bore with the diagonal intermediate section extending between the parallel leg sections and across the bore.

3,970,352

ELECTRICAL CONNECTOR HAVING IMPROVED CONTACT RETENTION SYSTEM

Robert Francis Dorrell, Des Plaines, and Joseph Janatka, La Grange Park, both of Ill., assignors to Bunker Ramo Corporation, Oak Brook, Ill.

Continuation of Ser. No. 291,573, Sept. 25, 1972, abandoned, which is a continuation-in-part of Ser. No. 885,123, Dec. 15, 1969, abandoned. This application Dec. 9, 1974, Ser. No. 530,619
Int. Cl.² H01R 13/42
U.S. Cl. 339—59 M **6 Claims**



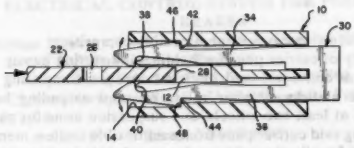
1. In an electrical connector, in combination, a plurality of parallel conductive contacts, each having a terminal portion, a body portion and an enlarged shoulder between said body portion and said terminal portion; in combination with contact-supporting and isolation means consisting of one dielectric body member comprising a transverse wall of insulation material having a plurality of parallel contact-receiving cavities closely surrounding the body portions of said contacts with risers around each contact extending from the aforesaid dielectric body toward and in a contact positioning relationship with the aforesaid contact shoulder; a second dielectric body member comprising a transverse wall of insulating material having a plurality of parallel contact-receiving cavities surrounding the terminal portions of the individual contacts with risers extending from the said second dielectric body toward and in a contact positioning relationship with the aforesaid contact shoulder; together with a single isolation disc confined between said dielectric body members, each of said risers having an outer periphery, said isolation disc having a plurality of holes therethrough closely surrounding the risers and being disposed in a sealing relationship with at least a portion of the outer periphery of each riser, said isolation disc being imperforate between said holes to provide an effective seal around and between the individual contacts; the risers of at least one of the dielectric body members extending into engagement with said contact shoulders.

3,970,353

LOCKING CLIP

John Wilson Kaufman, Hershey, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Aug. 29, 1974, Ser. No. 501,942
Int. Cl.² H01R 13/54
U.S. Cl. 339—75 MP **2 Claims**



1. In combination with an edge board connector for printed circuit boards and the like, a locking clip substituted for a pair of contacts in said connector to secure a printed circuit board therein, said clip comprising:

a body portion,

a pair of spaced cantilever arms extending integrally from one side of said body portion, said arms having a normally diverging configuration outside said connector and being biased to a substantially parallel configuration inside said connector,

a tine on the free end of each said arm directed inwardly towards the other of said arms, each said tine having an inclined surface directed toward the free end of said arms and a sharp shoulder directed toward said body;

a locking shoulder projecting outwardly from each said arm intermediate the ends thereof, said shoulders engaging said connector to bias said arms to their parallel configuration and providing a fulcrum about which said arms pivot when a board is inserted therebetween, whereby said tines are biased for insertion into apertures in said printed circuit board to lock the board therein.

3,970,354

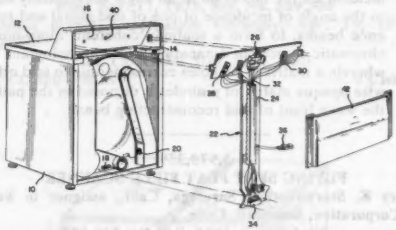
INTRINSIC CERTIFICATION ASSEMBLY TECHNIQUE FOR WIRING COMPONENTS INTO AN ELECTRICAL APPARATUS

John Root Hopkins, Belleair, Fla.; Robert Maurice Renn, and Robert Keith Southard, both of Harrisburg, Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Nov. 4, 1974, Ser. No. 520,399

Int. Cl.² H01R *3/00*

U.S. Cl. 339—113 R **7 Claims**



1. In a wiring system, means to provide a positive indication of the full mating of a connector member with an associated component member comprising:

fixed indicia means on at least one of said members, said fixed indicia means interacting with the other of said members to provide a physical and visible indication only upon full and complete mating of said members.

7. A method to provide a positive indication of the full mating of a connector member with an associated component member comprising:

providing fixed indicia means on at least one of said members, which indicia means interacts with the other of said members to provide a physical and visible indication only upon full and complete mating of said members.

3,970,355

COAXIAL CABLE FITTING

Franz Pitschi, Rottach-Egern, Germany, assignor to Spinner GmbH, Elektrotechnische Fabrik, Munich, Germany

Filed May 10, 1974, Ser. No. 468,921

Claims priority, application Germany, May 15, 1973, 2324552

Int. Cl.² H01R *17/18*

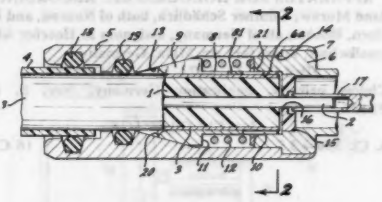
U.S. Cl. 339—177 R **20 Claims**

1. Hf cable fitting for connection to the end of a coaxial cable;

a sleeve member for slipping onto and over the end of a cable in axial direction and including an internal control surface;

clamping means disposed in the sleeve member for axial movement therein and cooperating with said control surface to contract radially inwardly as a radially inwardly acting clamp when in axial forward positions, while permitting radial outward spreading when moved from the forward positions in a particular axial direction colinear with the axial direction of insertion of a cable in the sleeve;

resilient means acting axially on the clamping means and causing the clamping means to assume one of said forward positions;



the clamping means constructed for engagement with the periphery of an axially inserted cable thereby causing the clamping means to be moved from the forward positions against the bias of the resilient means, upon cessation of the insertion of the cable the resilient means moving the clamping means back into one of the forward positions and holding it in one of the forward positions, whereby engagement of the clamping means with said control surface provides for the radially inwardly directed clamping action against and of the insert cable, the resilient means providing clamping force for obtaining said clamping action; and connecting means in the sleeve member to make contact with an exposed peripheral portion of said cable.

3,970,356

SOCKET FOR BUSBARS

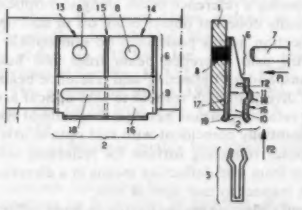
Jean Joly, Houilles, France, assignor to La Telemecanique Electrique, France

Filed Mar. 17, 1975, Ser. No. 559,359

Claims priority, application France, Apr. 22, 1974, 74.13917

Int. Cl.² H01R *13/06*

U.S. Cl. 339—252 P **10 Claims**



1. A socket, for securing in electrical connection on an aluminium busbar and adapted to receive in electrical connection a copper-faced plug, comprising a metal sheet constituted by a layer of aluminium bonded integrally with a layer of copper such that a first major face of the sheet is aluminium and a second major face of the sheet is copper, said sheet being bent along a number of fold lines so as to provide a first major wall, a second major wall opposite to and spaced transversely from the first major wall, and transverse walls extending between the first and second major walls, the respective surfaces of the first and second major walls which face each

other being those of the copper layer and the respective surfaces which lie at the exterior of the socket being those of the aluminium layer, the opposed portions of the first and second major walls forming a copper-surfaced sheath defining a direction of entry and withdrawal for a copper-faced plug, and the first major wall having a zone accessible for application of a spot-welding electrode to weld said zone, in aluminium-to-aluminium contact, to a busbar.

3,970,357

APPARATUS FOR HOLOGRAPHIC RECORDING

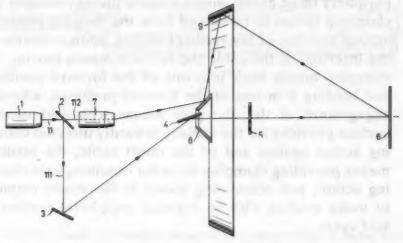
Roland Moraw; Günther Schädlich, both of Naurod, and Klaus Horn, Hochst, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Oct. 31, 1974, Ser. No. 519,585

Claims priority, application Germany, Nov. 5, 1973, 2355136

Int. Cl.² G03H 1/28

U.S. Cl. 350—3.5 **18 Claims**



1. Apparatus for recording a plurality of holographic images upon the same region of a recording medium comprising:

a. a coherent radiant energy source,

b. means for directing a radiation beam from said source along an optical axis of said apparatus,

c. beam splitting means positioned on said optical axis for producing a reference beam along said optical axis and a mutually coherent object beam off of said optical axis,

d. deflection means positioned on said optical axis for receiving said reference beam from said beam splitting means, and for deflecting said reference beam in a direction divergent with respect to said optical axis,

e. first reflecting means having a longitudinal symmetry axis substantially coincident with said optical axis and having an outer reflecting surface for reflecting said reference beam from said deflection means in a direction divergent with respect to said optical axis,

f. second reflecting means having an inner reflecting surface for reflecting said reference beam from said first reflecting means in a direction convergent with respect to said optical axis, said reference beam thereby impinging on said recording medium,

g. means for reflecting said object beam from an off-axis direction to a direction substantially along said optical axis and extending beyond said first and second reflecting means to an object to be recorded, whereby said object beam is altered by said object and said altered object beam and said reference beam interfere at the same region of said recording medium.

3,970,358

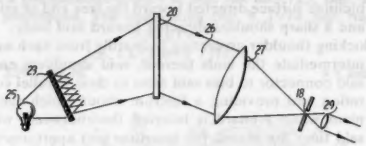
COHERENT, QUASI-MONOCHROMATIC LIGHT SOURCE

Adam Kozma, Ann Arbor, Mich., assignor to Harris Corporation, Cleveland, Ohio

Filed Jan. 20, 1975, Ser. No. 542,185

Int. Cl.² G02B 5/32

U.S. Cl. 350—3.5 **5 Claims**



1. A method of converting a broad light source into a spatially coherent, quasi-monochromatic light source, which comprises

recording a hologram in a thick recording medium as fringe planes of the interference pattern of a signal beam and a reference beam obtained from a coherent monochromatic light source, with an otherwise opaque matrix of pinholes disposed in the path of the wavefront of one of said signal and reference beams, and

reading out the hologram with a reconstructing beam obtained from a polychromatic incoherent light source and incident on the hologram at an angle substantially equal to the angle of incidence of one of said signal and reference beams, to form a spatially coherent, quasi-monochromatic wavefront emanating from the hologram and wherein a matrix of pinholes corresponding to said otherwise opaque matrix of pinholes is disposed in the path of the wave front of said reconstructing beam.

3,970,359

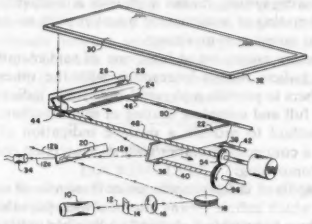
FLYING SPOT FLAT FIELD SCANNER

Gary K. Starkweather, Saratoga, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed Feb. 3, 1975, Ser. No. 546,477

Int. Cl.² G02B 27/17; G03G 15/28; G03B 27/70; H04N 3/00

U.S. Cl. 350—7 **1 Claim**



1. A flying spot scanning system comprising: a laser generating a beam of collimated light; a generally planar document station; a first mirror; a second mirror; a beam splitter; optical means for imaging said beam to said document station; a rotatable polygon scanner located between said laser and said beam splitter and in the path of said beam for scanning said beam onto said beam splitter said beam splitter reflecting said beam to said first mirror; said first mirror reflecting said beam to said second mirror; said second mirror reflecting said beam to said document station; means for detecting reflections of said beam from said document station; said second mirror directing said beam to said document station at an angle to receive reflection of said beam from said document and direct the same to said first mirror which directs the same to said beam splitter whereby a portion thereof passes therethrough;

said detecting means being positioned to detect the beam reflections passing through said beam splitter; said optical means including a cylinder lens, the power plane of which is substantially parallel to the axis of polygon rotation; said cylinder lens being located between said first and second mirrors, each of said mirrors and said cylinder lens extending across said document station in the direction of beam scan whereby the beam will be scanned across said document station in an *x* direction; means mounting said first and second mirrors and said cylinder lens for movement in *y* direction transverse to said *x* direction; means for moving said second mirror and said cylinder lens as a unit in said *y* direction across substantially the full length of said document station and for simultaneously moving said first mirror in the same direction as said second mirror and cylinder lens are moved a distance substantially less than the distance said second mirror and said cylinder lens are moved; the relative distance of and the relative rate of movement of said mirrors and cylinder lens being such to maintain the length of said beam between said laser and said document station and the optical conjugates substantially constant.

3,970,360

WAVE-GUIDE STRUCTURE WITH A MULTI-LAYER SYSTEM AND METHODS FOR PRODUCING SAME

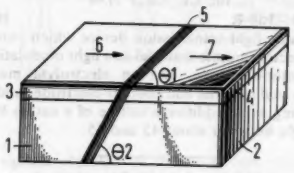
Ralf Kersten; Hans Mahlein, and Rudolf Oberbacher, all of Munich, Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Apr. 17, 1975, Ser. No. 569,305

Claims priority, application Germany, Apr. 19, 1974, 2418994

Int. Cl.² G02B *5/14, 5/20, 5/30*

U.S. Cl. 350—96 WG **9 Claims**



1. A wave-guide structure for use in optical communications comprising a substrate of a given index of refraction, a wave-guide layer having lateral edges and a different index of refraction disposed on a surface of the substrate, and a multi-layer system extending through the wave-guide layer between the lateral edges to separate the wave-guide layer into two wave-guide portions which are integral with the multi-layer system and in planar alignment with each other, said multi-layer system comprising a plurality of layers with different indexes of refraction, said multi-layer system extending at an angle to a surface of the wave-guide layer and at an angle to the lateral edges with at least one of the angles being an oblique angle so that radiation transported in one of the wave-guide portions has an angle of incidence with the multi-layer system.

3,970,361

THREE-DIMENSIONAL DISPLAY SYSTEM

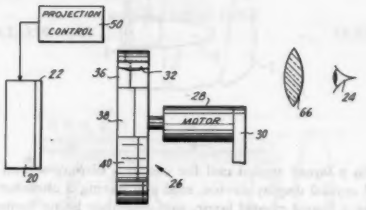
Paul L. Di Matteo, Huntington; Joseph A. Ross, Fort Salonga, and Howard K. Stern, Greenlawn, all of N.Y., assignors to Dynell Electronics Corporation, Melville, N.Y.

Filed Oct. 16, 1974, Ser. No. 515,146

Int. Cl.² G02B *27/22*

U.S. Cl. 350—144 **17 Claims**

1. A three-dimensional display arrangement comprising, in combination, a display screen for displaying an image thereon; transparent means of varying thickness movable continuously at substantially high speed past said display screen along a predetermined path, said transparent means having varying thickness along said path for varying the refraction of light from said display screen so that the image displayed on the screen will appear at varying depths to a viewer; means for moving said transparent means continuously past said display screen at a speed exceeding a predetermined magnitude related to the visual persistence of the human eye so that said viewer observing said image displayed on the screen perceives



said image to be in motion on the screen due to varying the refraction of light from said screen by movement of said transparent means, the perception of said viewer that said image is in motion being dependent on moving said transparent means continuously at relatively high speed, the optical path between said display screen and said viewer being free of reflections, said light from said display screen passing unfocused through said transparent means, said viewer perceiving said image to be in motion only by the refraction of said light from said display screen, the refracted light being substantially free of reflections.

3,970,362

PROCESS OF PRODUCING POLARIZING OPTICAL DEVICES AND PRODUCT THEREOF

Norman U. Laliberte, Woodstock, Conn., assignor to American Optical Corporation, Southbridge, Mass.

Continuation of Ser. No. 219,847, Jan. 21, 1972, abandoned, which is a division of Ser. No. 35,132, May 6, 1970, Pat. No. 3,674,587. This application July 3, 1974, Ser. No. 485,398

Int. Cl.² G02B *1/08, 1/04;* **G02C** *7/12*

U.S. Cl. 350—155 **6 Claims**

1. A polarizing ophthalmic quality lens blank casting comprising:

a convex-concave polarizing film;

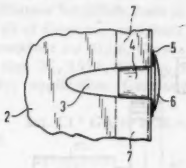
adhesive coatings on both sides of said film; and,

a continuous mass of optically clear thermoset resin, at least one component of which is of the class of allyl diglycol carbonates, cast in situ in contact with said adhesive coatings and forming a first layer adjacent the concave side of said film and a second layer adjacent the convex side of said film, said second layer being of a substantially uniform thickness in the range of one-fourth to one and one-half millimeters, said second layer being thinner than said first layer whereby said polarizing film is dispersed more closely adjacent the light entering convex side of said casting, said first and second layers being integrally formed and connected to each other.

3,970,363
LIQUID CRYSTAL CELL FOR A LIQUID CRYSTAL DISPLAY SCREEN

Hans Geyer, Baldham; Christoph Rotter, and Wolfgang Welsch, both of Munich, all of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Aug. 16, 1974, Ser. No. 497,878
Claims priority, application Germany, Aug. 20, 1973, 2342022
Int. Cl.² G02F 1/13
U.S. Cl. 350—160 LC **6 Claims**

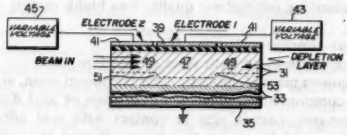


1. In a liquid crystal cell for use as a display screen for a liquid crystal display device, said cell having a chamber containing a liquid crystal layer, said chamber being formed by facing parallel surfaces of a pair of carrier plates which surfaces are each provided with an electrode pattern thereon and are spaced by means forming a frame which means is hermetically sealed to the edges of each of the plates to hermetically seal the chamber from an exterior of the cell, each of the plates being of an electrical insulating material and at least one plate being transparent, and the cell having at least one closable access means foe enabling communication with the chamber from the exterior of the cell, the improvement comprising each of the closable access means comprising a passage extending between the interior of the chamber and the exterior of the cell, said passage comprising a groove on one of said facing surfaces of one of said pair of plates, said groove extending inwardly from an edge of the plate into the interior of the chamber and having a depth decreasing as the distance from the edge increases so that the groove terminates at a point spaced inward of the frame means, a plug formed of a ductile metal sealingly disposed in the passage, and a sealing coating covering the plug and a portion of the exterior of the cell surrounding the passage.

3,970,364
DEPLETION LAYER LASER BEAM MODULATOR AND DEFLECTOR

Robert Gerson, and Robert J. Bell, both of Rolla, Mo., assignors to The Curators of the University of Missouri, Columbia, Mo.

Filed Aug. 20, 1974, Ser. No. 498,840
Int. Cl.² G02B 5/04, 5/14; H01L 29/78
U.S. Cl. 350—160 R **7 Claims**



4. Apparatus for deflecting a beam of radiation in a semiconductor device having a body of semiconductor material, conductive means being provided over said body but being seperated therefrom by insulating means, comprising:

a semiconductor device having a body of semiconductor material, conductive means being provided over said body but being separated therefrom by insulating means,

means for applying a first electric potential between said semiconductor body and a first portion of said conductive means to establish in the semiconductor body adjacent said first portion a first surface depletion layer of a first thickness,

means for applying a second electric potential between said semiconductor body and a second portion of said conductive means to establish in the semiconductor body adjacent said second portion a second surface depletion layer of a second thickness, said first and second portion being adjacent so that said second surface depletion layer is immediately adjecent said first surface depletion layer and forms a junction therewith, the difference in thickness between the first surface depletion layer and the second surface depletion layer resulting in a thickness discontinuity at the junction; and

means for coupling the beam of radiation directly into the first surface depletion layer of the semiconductor device, the radiation beam traveling through the first surface depletion layer at an oblique angle with respect to the junction of the first surface depletion layer and the second surface depletion layer to deflect the incident radiation beam in the second surface depletion layer relative to the direction of travel of the radiation beam in the first surface depletion layer, the relative thickness discontinuity determining the angle at which the radiation beam is deflected at the junction.

3,970,365
ADDITIVES THAT INCREASE THE STABILITY OF ELECTROCHROMIC FILMS IN ELECTROCHROMIC DEVICES

Robert Domenico Giglia, Rye, N.Y., assignor to American Cyanamid Company, Stamford, Conn.

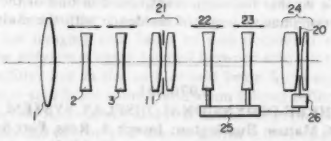
Filed Dec. 26, 1973, Ser. No. 428,170
Int. Cl.² G02F 1/36
U.S. Cl. 350—160 R **10 Claims**

1. A variable light transmission device which comprises a persistent electrochromic material as a light modulating material, a counter-electrode, and an electrolyte material in contact with said material and counter-electrode, said electrolyte containing as an additive a sulfate of a cation having an atomic weight between about 45 and 65.

3,970,366
HIGHLY VARIABLE MAGNIFICATION ZOOM LENS SYSTEM HAVING A DIAPHRAGM WITH ITS APERTURES DIAMETER VARIED IN RELATION WITH ZOOMING

Takeshi Sekiguchi, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 20, 1974, Ser. No. 453,050
Claims priority, application Japan, Mar. 23, 1973, 48-33310
Int. Cl.³ G02B 15/14
U.S. Cl. 350—184 **6 Claims**



1. A highly variable magnification zoom lens system having a diaphragm with its aperture diameter varied in relation to zooming comprising;

a front zoom part and a rear zoom part arranged consecutively in order, said front zoom part containing a lens group for focusing an object and a plurality of movable lens groups, said rear zoom part containing a fixed lens group, a plurality of movable lens groups and a fixed imaging lens group disposed at an image plane side spaced from said movable group;

an aperture setting means interposed between the rearmost movable lens group of said front zoom part and the frontmost movable lens group of said rear zoom part for determining relative aperture of the total zoom lens system;

a shifting means for displacing each of the movable lens groups of said rear zoom part along the optical axis; and

a shielding means disposed at an image plane side spaced from the movable lens groups of said rear zoom part and being actuated by said shifting means independently of said aperture setting means, the aperture size of said shielding means becomes smaller as the focal distance of the total lens becomes longer.

3,970,367

ZOOM LENS SYSTEM

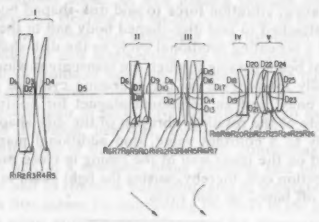
Sadahiko Tsuji, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 372,000, June 21, 1973. This application Jan. 23, 1975, Ser. No. 543,276

Claims priority, application Japan, July 20, 1972, 47-12514

Int. Cl.[2] G02B *15/16, 15/18*

U.S. Cl. 350—184 **4 Claims**



1. An optical objective of the zoom type comprising five lens groups of which the first, third, and fifth groups are convergent, the second group is divergent, and the fourth group is a divergent doublet consisting of convergent and divergent elements cemented together, the cemented contact surface being concave toward the front, in which the second group is axially movable to effect magnification variation, and the third group is axially movable forward and then rearward when zooming the second group from one extreme focal length range to the other, said zoom lens system being characterized by the following simultaneously applied relationships:

(1) $0.6\,f_w < -f_2 < 0.8\,f_w$;

$$0.8\left(-f_2+\frac{\sqrt{1/M}}{1+\sqrt{1/M}}\,e_{23}\right) < f_3 \leqslant \left(f_2+\frac{\sqrt{1/M}}{1+\sqrt{1/M}}\,e_{23}\right) \quad 2.$$

(3); the Abbe number of the concave lens of the fourth group being larger than that of the convex lens of the fourth group.

(4) $0.01 < N_{4\,concave} - N_{4\,convex} < 0.08$;

(5) $0.3\,f_w < -R_{4B} < 0.4\,f_w$

where f_w is the shortest focal length; f_T is the longest focal length; M is the magnification ratio f_T/f_W; f_i is the focal length of the i^{th} lens group; e_{23} is the minimum principal point interval between the second and third groups; R_{4B} is the radius of curvature of the cemented contact surface in the fourth group; $N_{4\,convex}$ is the refractive index for the d line of the spectrum of concave lens in the fourth group; and $N_{4\,concave}$ is the refractive index for the d line of the spectrum of the concave lens in the fourth group; wherein the overall focal distance from the first group to the third group is a positive value and shorter than the focal distance of the entire system, wherein the overall focal distance between the fourth group and the fifth group is a negative value, and wherein a telephoto type optical system is formed with the whole groups.

3,970,368

OPTICAL ZOOMING LENS

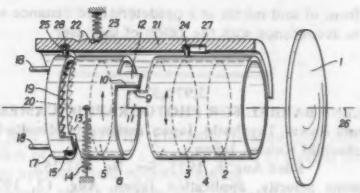
Peter Revy Von Belvárd, Vienna, Austria, assignor to Karl Vockenhuber and Raimund Hauser, Vienna, Austria

Filed June 3, 1974, Ser. No. 475,941

Claims priority, application Austria, June 14, 1973, 5262/73

Int. Cl.[2] G02B *15/00*

U.S. Cl. 350—187 **11 Claims**



1. A varifocal optical system focusable at different object distances, comprising:

first and second lens means movable independently of each other along a common optical axis;

zooming means including a first control member coupled with said first lens means via camming formations effective in one part of a range of displacement of said first control member for axially moving said first lens means to vary the focal length of the system, said camming formations being ineffectual in another part of said range;

focusing means including a second control member coupled with said second lens means for axially moving same to shift the focal plane of the system between a normal-range position and a close-up position;

operating means for displacing said first control member; and

deactivable coupling means effective in said other part of said range for releasably interconnecting said control members to facilitate axial movement of said second lens means without said first lens means by said operating means.

3,970,369

CORRECTIVE MAKEUP AND EMPLOYING PRESCRIPTION LENSES

Phyllis Wachsman, 400 Rugby Road, Brooklyn, N.Y. 11226

Filed Feb. 26, 1975, Ser. No. 553,256

Int. Cl.[2] G02B *17/00, 7/02*

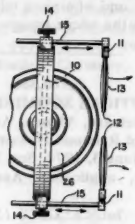
U.S. Cl. 350—202 **9 Claims**

1. A makeup mirror assembly adapted for use by an individual having a visual handicap, which handicap can be corrected by means of corrective lenses or the like, comprising:

a. a mirror having a reflecting surface,

b. a first and second corrective lens assembly positioned in front of said reflecting surface, one at a right side and one at a left side, each of said first and second lens being pivotally mounted at a distance in front of said mirror to enable a user to view an image reflected from said surface with minimum distortion, and

c. adjustable means for coupling said first and second lens assembly to such mirror for adjusting said distance in



front of said mirror at a predetermined distance selected in accordance with the vision of said user.

3,970,370

LENS BARREL FOR PHOTOGRAPHIC CAMERAS

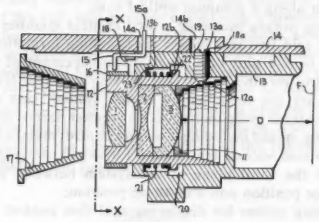
Susumu Kawai, Toyohashi, Japan, assignor to Minolta Camera Kabushiki Kaisha, Japan

Filed Aug. 6, 1975, Ser. No. 602,252

Claims priority, application Japan, Aug. 12, 1974, 49-96803[U]

Int. Cl.² G02B 7/04

U.S. Cl. 350—255 10 Claims



1. A lens barrel for a camera comprising: an objective lens unit;

an outer sleeve adapted to be mounted on a camera;

an inner sleeve integrally coupled with said objective lens unit and movably mounted within said outer sleeve;

helical cam means provided at one end portion of said inner sleeve and assisting in adjusting the focus of said objective lens unit;

a screw threadably fitted within said outer sleeve and having an end portion engageable with said helical cam means;

biasing means for urging said inner sleeve so as to cause said helical cam means to engage said end portion of said screw, said inner sleeve being moved in an axial direction relative to said outer sleeve through the engagement between said end portion of said screw and said helical cam means when said screw is screwed inwardly; and

manually operable means for rotating said inner sleeve relative to said outer sleeve, said inner sleeve, when rotated, being shifted relative to said outer sleeve in the axial direction for focus adjustment through the engagement between said end portion of said screw and said helical cam means.

3,970,371

APPARATUS FOR CHOPPING LIGHT BEAM

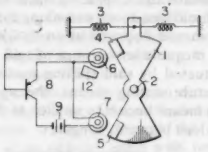
Yataro Kaiwa, Tokyo, and Hiroshi Saito, Hasuda, both of Japan, assignors to Japan Servo Co., Ltd., Tokyo, Japan

Filed Mar. 15, 1974, Ser. No. 451,683

Claims priority, application Japan, Mar. 16, 1973, 48-30067

Int. Cl.² G05D 25/00

U.S. Cl. 350—273 3 Claims



1. A light beam intercepting apparatus which comprises a casing containing at least one transparent window for the passage of a light beam therethrough, a disk-shaped vibrating body rotatably disposed within said casing, said disk-shaped body having a partially cut-away portion, two magnets located at different portions of said disk-shaped body, a detection coil and an excitation coil disposed in the inner wall of the casing at locations opposite to said two magnets, respectively, a transistor circuit having said detection coil and excitation coil in its base side and collector side, respectively, for supplying said rotating, vibration force to said disk-shaped body, spring means attached to said disk-shaped body and to the casing to provide a repeating rotational cycle to the disk-shaped body, said light beam passing through the transparent window being repeatedly intercepted by the repeating cycle of said disk-shaped body, and an additional magnet for controlling the amplitude of the rotating vibration of the disk-shaped vibrating body to a constant value, said additional magnet being disposed on the inner wall of the casing in close proximity to the detection coil, thereby causing the light beam to be turned on and off based on said cycle.

3,970,372

MOTOR DRIVEN LIGHT CHOPPER

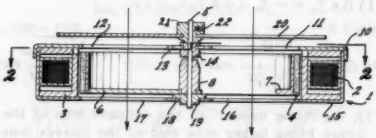
Kurt Moldenhauer, Frankfurt am Main, and Heinrich Stolz, Muhlheim am Main, both of Germany, assignors to Hartmann & Braun Aktiengesellschaft, Frankfurt am Main, Germany

Filed Jan. 15, 1975, Ser. No. 541,135

Claims priority, application Germany, Jan. 22, 1974, 2402865

Int. Cl.² G05D 25/00

U.S. Cl. 350—274 3 Claims



1. A motor-driven light chopper comprising:

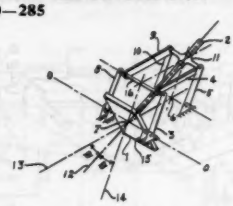
a flat motor casing with top and bottom end faces, each having at least one window, the windows being axially aligned and having axially aligned means for journalling a shaft;

the shaft being journalled in said casing, but projecting from said casing;

a light chopping diaphragm disposed outside of said casing and mounted on said shaft where projecting from said casing;

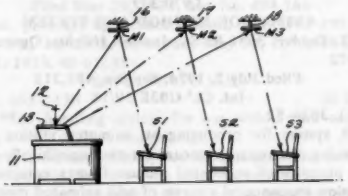
an annular stator construction in said casing;
an annular rotor in said casing having a central opening to permit passage of light as passing through said aligned windows; and
having disposition to be shaded by the diaphragm at least one spoke element traversing said central opening for connecting said shaft to said annular rotor.

3,970,373
MIRROR STEERING SYSTEM
Richard Payne Pledger, Fort Worth, Tex., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.
Filed Feb. 6, 1975, Ser. No. 547,855
Int. Cl.² G02B 27/17
U.S. Cl. 350—285 1 Claim



1. A mechanical mirror steering system comprising: a base; a first pair of trunnion bearings mounted on the base; a mirror pivotally mounted about an axis passing through said first trunnion bearings; steering rod means connected to the mirror for moving the mirror and extending in a direction normal thereto, along an axis intersecting the first trunnion axis; a second pair of trunnion bearings mounted on the base in a spaced parallel relationship to said first trunnion bearings; a first and second pair of links, pivotally attached to said first and second trunnion bearings, for movement in parallel planes; a third pair of links each pivotally connecting a first and second link in a common plane whereby said links and base form a pair of rhombic parallelograms in separate parallel planes; a first means for connecting the links in the parallel planes at a pivot point; a second means for connecting the parallel planes at a pivot point including, a slider bearing adapted to receive said steering rod means and thereby cause the mirror to move only within the range allowed by the pivotally connected links.

3,970,374
OPTICAL VISUAL COMMUNICATION SYSTEM
John C. Copp, P.O. Box 167, Strasburg, Va. 22657
Continuation-in-part of Ser. No. 446,508, Feb. 27, 1974, abandoned. This application May 15, 1975, Ser. No. 577,838
Int. Cl.² G02B 5/08; G09B 1/00
U.S. Cl. 350—301 13 Claims

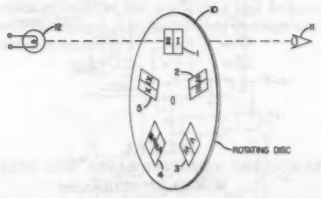


1. An optical system for use in a classroom having an instructor's desk and a plurality of student desks for providing visual communication between an instructor and a plurality of students comprising a plurality of first plane mirrors, mounting means for mounting each f said first plane mirros physically above one of the student desks, a second plane mirror, mounting means for mounting said second plane mirror in visual alignment with the position of an instructor at the instructor's desk, each of said first plane mirrors being oriented in a predetermined plane for reflecting a visual image of activity at its associated student desk to said second plane mirror, said second plane mirror being oriented to reflect the plurality of images of activity at the student desks into the visual field of and instructor at the instructor's desk.

3,970,375
LIGHT EQUALIZER
Henry H. Blau, Jr., Wayland, and Paul L. Kebabian, Somerville, both of Mass., assignors to Environmental Research & Technology, Inc., Concord, Mass.
Division of Ser. No. 458,124, April 5, 1974, Pat. No. 3,887,262. This application Dec. 9, 1974, Ser. No. 530,695
Int. Cl.² G02B 5/24, 5/14
U.S. Cl. 350—312 1 Claim

1. A light equalizer for providing substantially uniform distribution of light within a spectral region of interest across an output aperture, said equalizer having
an enclosure having opposite ends transparent to said light,
a body of fluid disposed in said enclosure and being transparent to said light,
a plurality of minute particles distributed in said fluid and being transparent to said light, said particles and said fluid having different indices of refraction with respect to said light within said spectral region; and
internally wholly reflective means disposed about the entire exterior of said enclosure except for said opposite ends.

3,970,376
DEVICE FOR TESTING COLOR VISION
Hanne-Lore Ledl, Munich, Germany, assignor to Optische Werke G. Rodenstock, Germany
Filed July 11, 1974, Ser. No. 487,758
Claims priority, application Germany, July 14, 1973, 2335909
Int. Cl.² A61B 3/06
U.S. Cl. 351—35 8 Claims



1. In an instrument for testing color vision in which a plurality of pairs of test panels of different colors are presented to a subject to be examined and are illuminated by a light source having a color temperature of about 2400°K, the improvement wherein said pairs of test panels comprise:
a first pair of panels, a first of which has maximum emission values at wavelengths of 4100 A and 6800 A and a second of which has maximum emission values at 4400 A and 6800 A;
a second pair of panels, a first of which has maximum emission values at 4400 A and 6800 A and a second of which has a more intense emission in the red range at 6700 A

as compared to the first panel of said second pair and has approximately the same maximum emission values as the first panel of the second pair; and

a third pair of test panels, a first of which has maximum emission values at 4100 A and 5800 A and a second of which has a maximum emission at 5000 A.

6. In a method of testing color vision of a subject to be examined wherein test panels of different colors are presented to the subject and are illuminated by a light source having a color temperature of about 2400°K, the improvement comprising the steps of:

a. sequentially presenting to the subject plural pairs of test panels respectively including

a first pair of panels, a first of which has maximum emission values at wavelengths of 4100 A and 6800 A and a second of which has maximum emission values at 4400 A and 6800 A;

a second pair of panels, a first of which has maximum emission values at 4400 A and 6800 A and a second of which has a more intense emission in the red range at 6700 A as compared to the first panel of said second pair and has approximately the same maximum emission values as the first panel of the second pair;

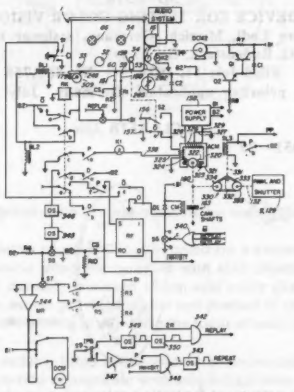
a third pair of test panels, a first of which has maximum emission values at 4100 A and 5800 A and a second of which has a maximum emission at 5000 A;

b. evaluating the degree of an existing anomaly in the color vision of the subject in accordance with the response of the subject to the respective sequential viewing presentation of said pairs of panels.

3,970,377
SOUND MOTION PICTURE PROCESSING AND PROJECTION SYSTEM

Donald T. Scholz, Watertown, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Division of Ser. No. 374,639, June 28, 1973, Pat. No. 3,893,756. This application Dec. 12, 1974, Ser. No. 531,871
Int. Cl.² G03B *31/02*
U.S. Cl. 352—14 **9 Claims**

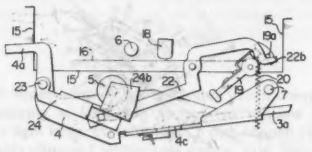


2. In apparatus for processing and producing sound motion pictures in response to the insertion of a cassette containing a strip of motion picture film bearing a sound track, the combination comprising, incremental drive means for moving the film incrementally past a projection station, a sound transducer adapted to engage the sound track, capstan means for advancing the film continuously past the sound transducer, a servomechanism for driving said capstan means at a speed determined by the length of the film between said capstan and said incremental drive means to form and maintain a loop of film of constant average size, sound reproducing means, and switching means operative after a delay sufficient to permit the formation of said loop to connect said transducer to said sound reproducing means.

3,970,378
MOVIE CAMERA CAPABLE OF MAGNETIC RECORDING SIMULTANEOUSLY WITH FILMING

Katsuhide Takagi, Okaya, and Toshiro Fukasawa, Shimosuwa-cho, both of Japan, assignors to Sankyo Kogaku Kogyo Kabushiki-Kaisha, Suwa, Japan

Filed Apr. 25, 1975, Ser. No. 571,461
Claims priority, application Japan, Apr. 27, 1974, 49-47931
Int. Cl.² G03B *23/02*
U.S. Cl. 352—30 **6 Claims**



1. In a sound motion picture camera having a lateral opening through which a cartridge encasing a film is inserted and removed; a cover closing said opening; a sound recording transducer and a capstan driving said film, and a release mechanism for actuation upon initiation of a recording operation while filming; the improvement comprising:

a pinch roller,

a bracket pivoted in response to the closing and opening of said cover and locked in a predetermined position in response to the closing of said cover;

a plate carrying said pinch roller, said plate being pivotally mounted on said bracket to permit said pinch roller to move relatively to said bracket;

means responsive to the pivoting of said bracket to said predetermined position to move said pinch roller from a first normal position it assumes when said cover is open to a second position closely adjacent but not contacting said capstan,

a spring resiliently connected between said plate and the release mechanism;

a pad carried on said bracket for selectively urging the recording track of the film against said recording transducer,

and means responsive to the actuation of said release mechanism for pivotally moving said plate against the force of said spring to thereby move said pinch roller to a third position in which it urges said film against said capstan.

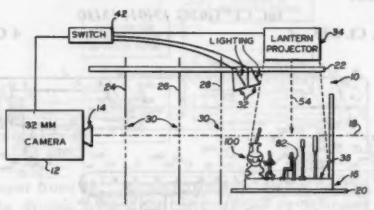
3,970,379
ANIMATION METHOD AND SYSTEM

Tobe T. Fedder, 3531 85 St., Jackson Heights, Queens, N.Y. 11372

Filed July 2, 1974, Ser. No. 485,212
Int. Cl.² G03B *19/18*
U.S. Cl. 352—52 **14 Claims**

1. A system for producing an animated motion picture comprising photographic means for photographically recording a plurality of sequential picture frames comprising an animation sequence of a scene of said animated motion picture, a shooting surface means in optical alignment with said photographic means, said photographic means photographically recording the animation segment content of said shooting surface means for each picture frame comprising said animated scene sequence, said shooting surface means animation segment content sequentially varying for each frame in

accordance with a predetermined animated scene sequence to provide said animated motion picture, said shooting surface means animation segment content comprising background means, set objects and character objects for each of said frame animation segments, said background means, set objects and character objects having a predetermined position on said shooting surface means for each given frame animation segment content, each of said positions being determined in accordance with said predetermined animated scene sequence, at least said character objects being three dimensionally sequentially variable in position with respect to said photographic means for each of said frame animation segments, at least some of said character objects comprising substantially two dimensional cartoon drawings which are three dimensionally variable in position, a scene registration layout projection having indicia thereon indicating each of the positions of at least said character objects and said scenic objects for all of said frame animation segments comprising said animated motion picture animation sequence to provide a projection of the complete scene layout and sequential character object movement for said predetermined animated motion picture animated scene sequence, and means for projecting said scene registration layout projection on to said shooting surface means only when said frame animation segment is not being photographically recorded, whereby the animation segment content for the next succeeding frame in said plurality of sequential picture frames comprising said animated scene sequence may be aligned with respect to the previous frame animation segment in said sequence prior to the photographic recording of said next succeeding frame animation segment and said registration layout for said sequence will be absent from each photographically recorded segment of said sequence.



3,970,380

FILM HANDLING SYSTEM EMPLOYING A COMMON CARTRIDGE

Akira Ashida, Tokyo; Kazuo Ishikawa, Kawasaki; Kiyoshi Takahashi, Kunitachi; Yoshio Komine, Tokyo, and Kazuya Hosoe, Machida, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed May 29, 1974, Ser. No. 474,156

Claims priority, application Japan, May 31, 1973, 48-61685; May 31, 1973, 48-61686; May 31, 1973, 48-61687; May 31, 1973, 48-61688

Int. Cl.² G03C *11/00*

U.S. Cl. 352—130 **36 Claims**

1. A film handling system for use with a film cartridge housing a strip of film, comprising:

a first means for selectively activating said film cartridge for placing said film in a state allowing exposure;

a second means for selectively activating said film cartridge for placing said film in a state allowing processing; and

a third means for selectively activating said film cartridge for placing said film in a state allowing projection;

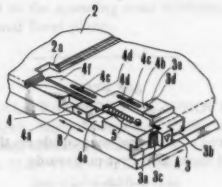
wherein said film cartridge is used sequentially by said first, second and third means in the recited order, said cartridge comprising:

a housing;

a processing means positioned within said housing to process said film, which is selectively activated by said second means and includes processing liquid to process said film, and a processing liquid, receiving the activating force of said second means so that said processing liquid can be selectively supplied to a film surface; and

an indication means to indicate which one of the said first, second and third means through which said film has passed, wherein said indication means is shiftable in turn to a first position to indicate that said film has not yet passed through the first means, a second position to indicate that the same film has passed through the first means, and a third position to indicate that it has passed through the second means; and

a control means included in said system for detecting said indication means for controlling the action of said first, second, and third means, wherein said control means detects the position at which said indication means is placed when said film cartridge is mounted into said system to control the advancing and stopping of the film cartridge so that it proceeds through each step in a prescribed order.



3,970,381

METHOD AND APPARATUS FOR XEROGRAPHIC REPRODUCTION

Thomas Meagher, West Webster, and Robert J. Michatek, Fairport, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Continuation of Ser. No. 335,967, Feb. 26, 1973, abandoned. This application Jan. 21, 1974, Ser. No. 435,349

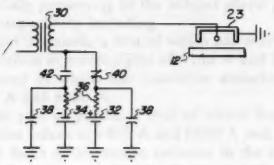
Int. Cl.² G03G *15/00, 13/00*

U.S. Cl. 355—3 R **9 Claims**

4. A method to provide improved stripping of a transfer member from a photoconductive surface after transfer of a developed latent electrostatic image to the transfer member comprising the steps of:

a. charging the lead edge of the transfer member to provide a charge of a first magnitude on the edge, and then

b. charging the image bearing portion of the transfer member without altering the charge on the lead edge to provide a charge of a second magnitude on the portion which is different from said first magnitude.



3,970,382

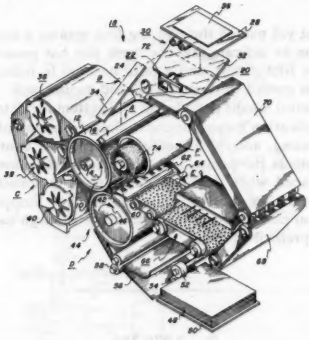
SPATIALLY SELECTIVE OPTICAL SYSTEM

Donald H. Fisher, Marion, and Vincent J. Crociata, Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Continuation of Ser. No. 375,276, June 29, 1973. This application Sept. 16, 1974, Ser. No. 506,653

Int. Cl.² G03G *15/052*

U.S. Cl. 355—4 **9 Claims**



5. An electrophotographic printing machine of the type having a photoconductive surface, including:

means for charging the photoconductive surface;

means for creating a light image of an original document;

means for filtering the light image to produce a single color light image; and

a normally transparent photochromic filter interposed between the photoconductive surface and said filtering means in the path of the single color light image, said photochromic filter, responsive to the intensity of the single color light image, darkening to automatically regulate the intensity of the single color light image transmitted therethrough for irradiating the charged photoconductive surface to selectively dissipate the charge thereon in accordance with the intensity of the single color light image passing through said photochromic filter, said photochromic filter attenuating the high intensity light rays transmitted through said filtering means to a greater extent than the low intensity light rays transmitted therethrough and returning to the normally transparent condition when the single color light image is not being transmitted therethrough.

3,970,383

APPARATUS FOR COLOR ELECTROPHOTOGRAPHY

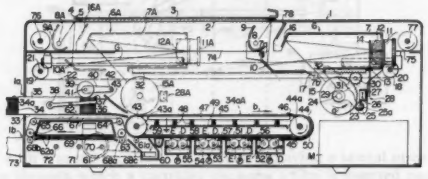
Saburo Honda, Tokyo; Kyoji Kunitomo, Koganei, and Yasumori Nagahara, Yokosuka, all of Japan, assignors to Ricoh Co., Ltd., Tokyo, Japan

Filed Nov. 14, 1974, Ser. No. 523,842

Claims priority, application Japan, Nov. 15, 1973, 48-128641

Int. Cl.² G03G *15/01*, *15/30*

U.S. Cl. 355—4 **4 Claims**



1. An apparatus for colour electrophotography comprising:

movable optical scanning means for successively scanning a stationary original document by moving thereacross from one end to the other;

at least one drum-shaped photoreceptor means movable together with the scanning means and rotated in synchronism with its movement such that its peripheral surface is exposed to an optical image from the scanning means for forming an electrostatic image of said original document thereon;

a plurality of different colour filter means for successively filtering the optical image to said photoreceptor during successive scans;

means for holding a copy sheet stationary in the path of said rotating photoreceptor during each scan of the scanning means to permit each electrostatic latent image from the photoreceptor to be successively transferred thereto; and

means for successively developing each latent image on the copy sheet with a developer of a colour corresponding to that of the filter used during the preceding scan.

3,970,384

SAFETY DEVICE FOR PHOTOCOPYING MACHINE

Eisuke Yamamoto, Tokyo; Susumu Sugiura, and Osamu Sawamura, both of Yamato, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 325,339, Jan. 22, 1973, abandoned. This application Dec. 2, 1974, Ser. No. 528,788

Claims priority, application Japan, Jan. 25, 1972, 47-9339

Int. Cl.² G03G *15/00*

U.S. Cl. 355—14 **1 Claim**

1. In a photocopying machine having a copy sheet stand for stocking copying paper to be sequentially fed into said machine, transporting means for picking up copying paper from said copy sheet stand and transporting said copying paper along a predetermined path through said machine, a driving system for driving said transporting means, heating means disposed along said predetermined path for processing said copying paper passing thereby, an electrical system for actuating at least said heating means, discharge means for discharg-

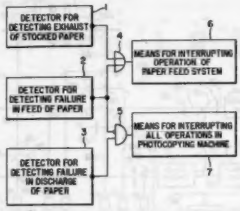
ing said copying paper from said machine after it has traveled along said predetermined path; a safety device comprising:

first detecting means for detecting when the stock of copying paper on said copy sheet stand is exhausted;

second detecting means for detecting a failure in feeding the copying paper from the copy sheet stand;

third detecting means for detecting a failure is discharging the copying paper from said discharge means;

means for interrupting said driving system in response to either said first detecting means detecting exhaustion of copy paper from the copy sheet stand or said second detecting means detecting a failure in feeding the copying


DETECTOR FOR DETECTING EXHAUST OF STOCKED PAPER
DETECTOR FOR DETECTING FAILURE IN FEED OF PAPER
DETECTOR FOR DETECTING FAILURE IN DISCHARGE OF PAPER
MEANS FOR INTERRUPTING OPERATION OF PAPER FEED SYSTEM
MEANS FOR INTERRUPTING ALL OPERATIONS IN PHOTOCOPYING MACHINE
4
6
2
5
3
7

paper from the copy sheet stand, in such a manner that the driving system can be restarted by actuating the power supply switch to off and then to on;

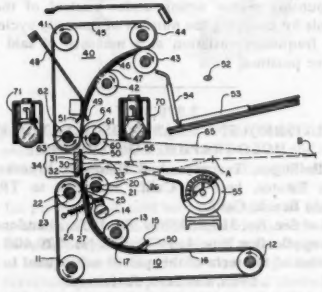
means for immediately interrupting said electrical system in response to said second detecting means not detecting a failure in feeding the copy paper from the copy stand and the third means detecting a failure in discharging the copying paper from said discharge means and said means for immediately interrupting said electrical system including means for retaining said electrical system in its interrupted mode regardless of the actuation of said power switch to off and then to on, until manually reset.

3,970,385

MICROFILM RECORDER DOCUMENT TRANSPORT SYSTEM

Robert L. Kearney, Northbrook, and Eugene Sather, Deerfield, both of Ill., assignors to Bell & Howell Company, Chicago, Ill.

Filed Nov. 15, 1974, Ser. No. 524,300
Int. Cl.² G03B 27/48, 27/50; B65H 29/24
U.S. Cl. 355—50 **8 Claims**



1. In a microfilm recording machine of the type which makes a photographic reproduction of documents processed therethrough and which includes a document input feed mechanism, a document exit and a scanning zone between the input feed mechanism and exit wherein each document is scanned and photographed, an improved document transport system for presenting each document in a predetermined focal plane within the scanning zone, said transport system comprising:

a transparent plate within the scanning zone having a longitudinal major surface portion lying substantially within the predetermined focal plane and having a transverse axis extending forward from said longitudinal major surface; and

a first pair of cooperating transport rollers between said plate and the document input feed mechanism rotatable about first axes of rotation to transport a document from the input feed mechanism into the scanning zone, said rollers forming a first nip to engage each document, said first nip being forward of said major surface and the plane embracing said axes of rotation converging upon said transverse axis; whereby,

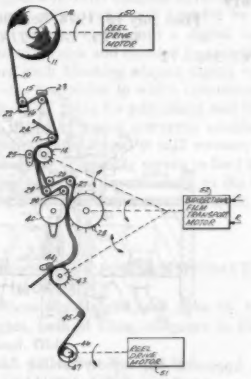
each document transported through the first nip of said transport rollers is directed toward and against said longitudinal major surface of said plate as it is transported through the scanning zone to assure that each document is presented to the scanning zone substantially within the predetermined focal plane.

3,970,386

BIDIRECTIONAL TRANSPORT OF SPROCKETED FILM

Hans Chr. Wohlrab, North Hollywood, Calif., assignor to PSC Technology, Inc., Glendale, Calif.

Filed Mar. 17, 1975, Ser. No. 559,008
Int. Cl.² G03B 27/10
U.S. Cl. 355—111 **11 Claims**



3. Film handling apparatus having an operating station past which sprocketed film is driven, a sprocket wheel with teeth that engage sprocket holes in the film, means for driving the sprocket wheel in one direction of rotation to transport the film past the operating station, and tensioning means over which the film passes before it reaches the sprocket wheel during transport to draw the film in the direction opposite to the direction of transport so as to index the film relative to the operating station while the sprocket wheel pulls the film past the operating station, the improvement comprising means for driving the sprocket wheel to transport the film in the direction opposite the one direction so the tensioning means pulls the film past the operating station.

3,970,387
NONDISPERSION, TWO BEAM, INFRARED GAS ANALYZER

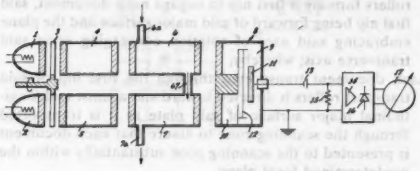
Reimar Faulhaber, Frankfurt am Main; Margareta Ascherfeld, Hattingen, and Walter Fabinski, Hattersheim, all of Germany, assignors to Hartmann & Braun Aktiengesellschaft, Frankfurt, Germany

Filed Feb. 5, 1975, Ser. No. 547,273

Claims priority, application Germany, Feb. 5, 1974, 2405317

Int. Cl.² G01N 21/36

U.S. Cl. 356—51 **4 Claims**



1. In a non-dispersion, two infrared beam gas analyzer having first and second beam paths extending respectively between means for providing two beams of infrared radiation and a two-input detector, each beam path including a cell with test gas which includes a carrier gas and, possibly, traces of a gas to be detected, the improvement of a selectivity cell in one of the beam paths containing no carrier gas but exclusively gas of the same type as the gas to be detected and at a pressure below the pressure of the test gas.

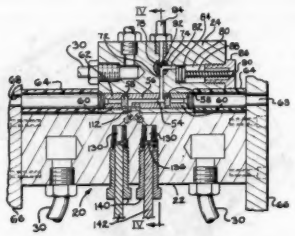
3,970,388
LIQUID STOPPED-FLOW APPARATUS

Charles L. Hacker, 2697 Parman Road, Dansville, Mich. 48819

Filed July 15, 1974, Ser. No. 488,567

Int. Cl.² G01N 21/00

U.S. Cl. 356—72 **5 Claims**



1. Apparatus for rapidly mixing fluids for evaluating the mixture while in a static condition comprising, in combination, an evaluation cell having an inlet and an outlet, fluid evaluation means directly associated with said cell, a fluid mixing chamber communicating with said cell inlet, a pair of injector chambers each having an inlet and an outlet and a piston slidably located therein, said chamber's outlets communicating with said mixing chamber and said inlets communicating with fluid supply means, a compression spring drivingly connected to said pistons for biasing said pistons into its associated injector chamber to force fluid therein into said mixing chamber and cell, an electric motor having a rotatable output drive shaft, a first cam mounted upon said drive shaft, a first cam follower engageable by said cam compressing said spring during partial rotation of said drive shaft, a valve within said cell outlet controlling exhausting of said cell, a second cam mounted upon said drive shaft, a second cam follower engaging said second cam controlling operation of said valve opening said valve after compression of said spring whereby opening of said valves causes said pistons to inject fluid into said mixing chamber and cell.

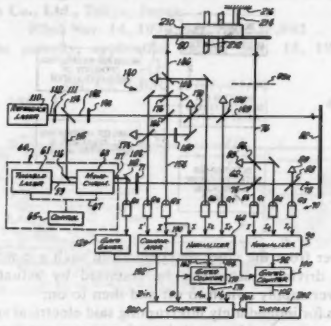
3,970,389
VARIABLE FREQUENCY INTERFEROMETER

Michael J. Mendrin, 425 Date St., Montebello, Calif. 90640, and Richard H. Taylor, 720 Mobile Ave., Los Angeles, Calif. 90022

Filed Feb. 14, 1974, Ser. No. 442,463

Int. Cl.² G01B 9/02

U.S. Cl. 356—106 R **18 Claims**



1. In combination with interferometric apparatus for dividing substantially coherent radiation between a reference component beam including a reference mirror and a target component beam including an adjustably movable target mirror, and for recombining the component beams to produce interference; means for measuring a selected position of the target mirror relative to a reference position corresponding to the virtual image of the reference mirror, comprising

means for causing the effective frequency of the interfering beams to vary monotonically over a predetermined frequency interval to produce a plurality of intensity cycles in the combined beam,

means for producing essentially monochromatic reference beams of the respective two end frequencies of said frequency interval,

means acting in response to radiation of said monotonically varying frequency and radiation of the respective reference beams for detecting frequency coincidence thereof and for generating respective gating signals,

and counting means acting under control of the gating signals for counting the number of intensity cycles during said frequency variation as a measure of said selected mirror position.

3,970,390
MULTIFREQUENCY LASER OSCILLATOR FOR HOLOGRAPHIC CONTOURING

Lee O. Heflinger, Torrance, and Ralph F. Wuerker, Palos Verdes Estates, both of Calif., assignors to TRW Inc., Redondo Beach, Calif.

Division of Ser. No. 310,859, Nov. 30, 1972, abandoned. This application Nov. 4, 1974, Ser. No. 520,600

The portion of the term of this patent subsequent to Sept. 7, 1988, has been disclaimed.

Int. Cl.² G01B 9/025; H01S 3/10; G02B 27/00

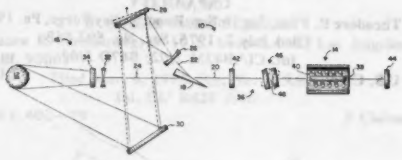
U.S. Cl. 356—109 **5 Claims**

1. Double exposure holographic contouring apparatus comprising:

a multifrequency laser oscillator comprising means forming an optical cavity including a rear end reflector and a front end output reflector, active lasing means in said cavity between said reflectors capable of lasing at two different

optical frequencies; means for pumping said lasing means; frequency selecting means for causing said lasing means to lase at said frequencies in rapid succession comprising a transmission etalon in said cavity between said lasing means and one end reflector which is rotatable between first and second positions and is turned to select said first frequency in said first position and said second frequency in said second position;

a beam splitter for splitting the output beam from said laser oscillator into a reference beam and a scene beam;



light-sensitive means disposed in a predetermined plane for recording a hologram of an object;

first fixed optical means for directing said reference beam toward said light-sensitive means; and

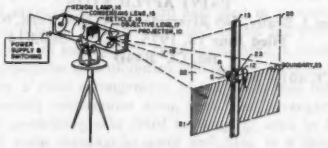
second optical means for directing said scene beam onto the object to be recorded and thence onto said light-sensitive means, the difference in said frequencies being such that range contours of a predetermined spacing are produced on the object.

3,970,391

DIRECTION DETERMINING METHOD AND APPARATUS

Philip M. Johnson, Windham, and Richard M. Northrup, Nashua, both of N.H., assignors to Sanders Associates, Inc., Nashua, N.H.

Filed July 29, 1974, Ser. No. 492,633
Int. Cl.² G01B *11/26*
U.S. Cl. 356—152 **49 Claims**



1. Apparatus for establishing at a first location a plane having a predetermined orientation and position and for locating a reference point on said plane at a second location comprising:

means for projecting to said second location an image having an illuminated and unilluminated portion separated by a boundary region which includes said reference point;

means at said second location for detecting said image at two detection points to produce first and second signals, each having an amplitude corresponding to the intensity of the image at a corresponding detection point; and

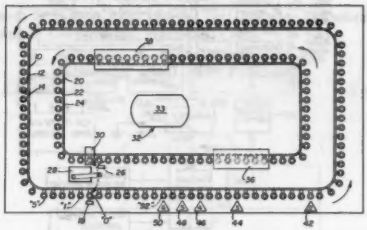
means for establishing said reference point from a predetermined comparison of said amplitudes, including means for indicating said reference point by the position of one of said two detection points when said predetermined comparison between the amplitudes of said two signals exists.

3,970,392

ANALOG TO DIGITAL TO ANALOG STORAGE AND RETRIEVAL FOR A PLURALITY OF PHOTOMETRIC BLANKING VALUES

David Richard Figueroa, Pembroke Pines, and Guenter Ginsberg, Miami, both of Fla., assignors to Coulter Electronics, Inc., Hialeah, Fla.

Continuation-in-part of Ser. No. 383,437, July 27, 1973. This application Oct. 17, 1974, Ser. No. 515,446
Int. Cl.² G01J *3/46*
U.S. Cl. 356—179 **7 Claims**



1. A storage and retrieval arrangement for a plurality of blanking values for use in a photometric system having a plurality of colorimeters which test a plurality of aliquots from a single test sample, said storage and retrieval arrangement comprising: means for distinguishing between the presentation of a blanking serum and a test sample to the photometric system, said distinguishing means generating a first signal to said arrangement to enable it to transduce blanking aliquots, as contrasted from test sample aliquots, and to provide an analog output for the absorbance value of each blanking aliquot; an analog to digital converter coupled to receive each said analog absorbance blanking value and enabled by said distinguishing means to convert same into a digital value; memory means coupled to receive and enabled by said distinguishing means to store each blanking aliquot digital value; memory addressing means responsive to which colorimeter is providing the analog blanking value for addressing said memory address location; a digital to analog converter coupled to receive as inputs the digital value stored in said memory and under control of said memory addressing means to feed same back to the correlated colorimeter for utilization at the time that such colorimeter is measuring a test sample aliquot.

3,970,393

AUTOMATIC COMPENSATION FOR DENSITOMETER IMBALANCE

Algirdas J. Krygeris, Richmond Heights, and John M. Manring, Cleveland Heights, both of Ohio, assignors to Harris Corporation, Cleveland, Ohio

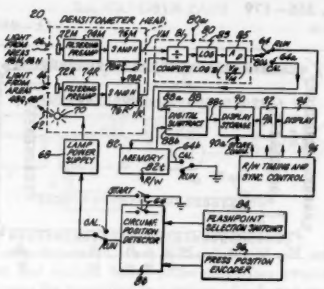
Filed July 23, 1974, Ser. No. 490,981
Int. Cl.² G01J *3/46*; G01N *21/48*
U.S. Cl. 356—195 **4 Claims**

1. The method of compensating densitometer readings where the densitometer is used to measure the relative optical density of a printed area during a printing operation on material in which densitometer light is directed onto the printed area of said material and transmitted therefrom along a first optical path with a characteristic of the transmitted light varying in accordance with the optical density, and densitometer light is directed onto an unprinted area of said material and transmitted therefrom along a second optical path to provide a reference light value, with the light along said paths being sensed by different optical sensing means to provide separate electrical test signals from which the relative optical density of the printed area is derived comprising the steps of

substituting first and second calibration areas for the printed and unprinted areas when the press is not print-

ing, second calibration area having the same light transmittting characteristics as said first calibration area, utilizing first and second optical sensing means for respectively sensing the light transmitted along said first and second paths to respectively provide first and second calibration signals in order to determine differences between said calibration signals, and deriving calibration data from said calibration signals,

storing said calibration data in a memory means,



measuring the apparent relative optical density of a printed area when the press is printed by transmitting light along said paths to a printed area and an unprinted area and utilizing said first and second sensing means for respectively sensing the light of said first and second paths to provide said separate electrical test signals, and deriving measurement data therefrom,

reading said calibration data from said memory means, and combining said measurement data and said calibration data to produce an indication of the actual relative optical density of said printed and unprinted areas.

3,970,394

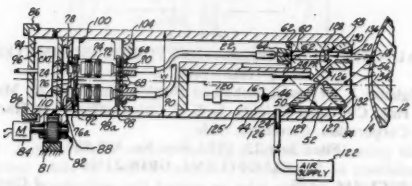
DENSITOMETER HEAD WITH FIBER OPTICS

Arthur J. Stanton, Warrensville Heights, Ohio, assignor to Harris Corporation, Cleveland, Ohio

Filed July 22, 1974, Ser. No. 490,397

Int. Cl.[2] G01J *3/46*; G01N *21/48*

U.S. Cl. 356—195 **9 Claims**



1. A densitometer head comprising a housing having first and second opposing walls, said first wall having apertures therein from which light is directed to a surface and reflected light received therefrom, a light source disposed in said housing for directing light therefrom onto the surface to be tested, first optical elements disposed between said light source and said first wall for directing the light onto the surface to be tested, second optical elements proximate said first wall for receiving light reflected from the surface, transducers for sensing the light received from the surface and disposed adjacent said second wall, light transmitting means comprising at least one fiber optics element per transducer for conducting light from said second optical elements to said transducers, said fiber optics elements extending from a location intermediate said first wall and said light source and extending to said transducers, and electrical circuit means for connecting said transducers to processing circuitry external of the head, each of the fiber optics elements in said head for conducting light to said transducers has first and second adjusting means connected respectively to the opposite ends of the fiber optics element to adjust the optical alignment transversely of the light received by and transmitted from the ends of the fiber optics elements, said fiber optics elements being flexible.

3,970,395

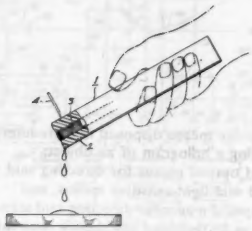
HOT-MELT ADHESIVE WITH SELF-MELTING CAPABILITY

Theodore R. Flint, Jug Hollow Road, Valley Forge, Pa. 19481

Filed July 2, 1975, Ser. No. 592,468

Int. Cl.[2] B43M *1/02*; B67D *5/62*

U.S. Cl. 401—1 **2 Claims**



1. An organic hot-melt adhesive with controllable self-melting capability comprising an adhesive composition readily melted by moderate temperatures and a pyrotechnic composition, said adhesive composition and pyrotechnic composition being coextensively joined forming an integral self-supporting unit, combustion of the pyrotechnic composition providing sufficient heat to cause that portion of said adhesive composition coextensive with the burning pyrotechnic composition to melt and flow for application to a work piece, while extinguishing the process of combustion of said pyrotechnic composition leaves the remaining adhesive composition and pyrotechnic composition available for further use.

3,970,396

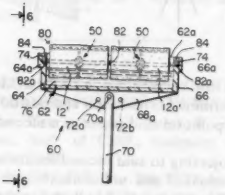
PAINT APPLICATOR

William J. Brady, 549 Riverside Drive, New York, N.Y. 10027

Filed June 18, 1975, Ser. No. 588,014

Int. Cl.[2] B44D *3/28*

U.S. Cl. 401—208 **2 Claims**



1. A device for applying paint to the undersides of two mutually adjacent substantially flat ceiling portions divided from each other by a straight line, comprising a container adapted to receive paint, said container having a bottom wall, side walls and end walls, a shaft supported between said end walls, applicator means for transferring paint from the bottom of said container to said ceiling portions, said applicator means comprising in part two identical cylindrical rollers of substantially larger diameter than said shaft surrounding said

shaft and spaced a short distance from each other, each of said rollers having a thin and somewhat flexible plastic disc inside thereof and secured thereto intermediate the length of the roller, said discs having central openings therethrough of slightly larger diameter than said shaft, a pair of opposed retainer washers of slightly larger diameter than said central openings secured to said shaft inside each of said rollers and clamping said discs, said applicator means consisting additionally of absorbent coatings surrounding said rollers, and elongated handle means extending from said container.

3,970,397

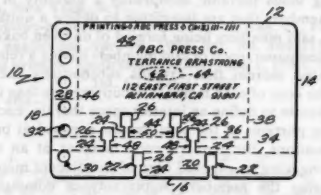
BUSINESS CARD SYSTEM

Terrance R. Armstrong, 3710 S. Grand Ave., Los Angeles, Calif. 90007

Filed Mar. 6, 1975, Ser. No. 555,816

Int. Cl.[2] B42F 3/00

U.S. Cl. 402—79 **5 Claims**



1. An apparatus of the Class described comprising a main rectangular card greater in size than the size of a standard business card and having a top edge, a side edge and a bottom edge, a first region of said main rectangular card defined by a first arrangement of tear lines forming a first rectangular area the size of a business card, the first rectangular area of the main rectangular card adapted to have information printed thereon, said first arrangement of tear lines permitting said first rectangular area to be torn away from said main rectangular card whereby the information printed on the first rectangular area can be filed in a first filing device adapted to hold cards the size of business cards, a second region of said main rectangular card including said first rectangular area defined by a second arrangement of tear lines and forming a second generally rectangular area, said second arrangement of tear lines permitting said second rectangular area to be torn from said main rectangular card and filed in a second filing device that is larger than the first filing device and which holds cards the size of said second rectangular area, a third region of said rectangular area including said second rectangular area defined by a third arrangement of tear lines and forming a third generally rectangular area, said third arrangement of tear lines permitting said third rectangular area to be torn from said main rectangular card and filed in a third filing device that is larger than the second filing device and which holds cards the size of said third rectangular area, said main rectangular card the size of cards filed in a fourth filing device, said fourth filing device larger than the third filing device, whereby said main rectangular card with said information printed on said first rectangular area can be filed therein, the bottom of said second rectangular area being defined by one tear line and the bottom of said third rectangular area being defined by a second tear line, said first and second tear lines parallel to each other and parallel to and below the bottom edge of said first rectangular area, openings associated with said first and second tear lines, said openings conforming to the shape of the perforations formed in cards filed in said second and third filing devices, the bottom edge of said main rectangular card parallel to and below said first and second tear lines and having openings formed therein, said openings conforming to the shape of the perforations formed in cards filed in said fourth filing devices so that the information printed on the first rectangular area can be filed in said second, third or fourth filing devices which have devices which penetrate said openings and which hold cards at their bottom edge, and a second group of holes, said second group of holes being disposed in a line parallel to the side edge of said main rectangular card, and shaped and positioned so the information printed on said first rectangular area and including said second or third rectangular areas or said main rectangular card can be filed in filing devices which have devices which penetrate said holes and which hold cards by the side edge.

3,970,398

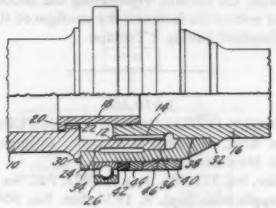
SHAFT COUPLING

Gregory S. Wilson, Fort Worth, Tex., assignor to United Technologies Corporation, Hartford, Conn.

Filed Aug. 4, 1975, Ser. No. 601,814

Int. Cl.[2] F16D 1/00; F16C 9/00

U.S. Cl. 403—26 **4 Claims**



1. A shaft coupling for joining axially aligned hollow shafts which shafts have mating splines, an internal nut threadably secured to one of said shafts and having an end flange engaging a shoulder formed on the other of said shafts, a hollow idle shaft surrounding said aligned axial shafts and their mating splines, bearing means supporting said idle shaft, shoulder means on the outer diameter of each of said axially aligned shafts engaging the opposite ends of said idle shaft and at least a pair of lands formed on the inner diameter of said idle shaft engaging a portion of each of said axially aligned shafts whereby each axially aligned shaft is supported independently of each other.

3,970,399

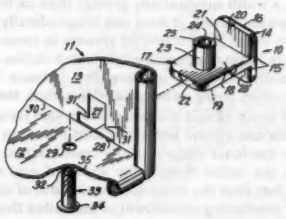
FASTENER ASSEMBLY AND FASTENER THEREOF

Nunzio J. Palumbo, Erie, Pa., assignor to Louis Marx & Co., Inc., Glen Dale, W. Va.

Filed Feb. 10, 1975, Ser. No. 548,721

Int. Cl.[2] A47B 23/00

U.S. Cl. 403—231 **1 Claim**



1. A fastener assembly for securing a pair of contiguous standards at substantially right-angles relative to each other including a fastener comprising first and second perpendicularly oriented webs, and means mounted on the second web for connecting a standard thereto; and including a first standard having a configured through slot, the second web being introduced through the slot until the first web abuts the first

standard; and a second standard abutting the second web and being contiguous with the first standard, the first web having an outer and an inner face, and the second web comprising a cantilever perpendicularly mounted on the inner face of the first web, the cantilever having an upper surface and a lower surface, and a through-hole proximate its free end, the second standard abutting the lower surface of the cantilever, the means mounted on the second web for connecting the second standard thereto comprising a collar upstanding on the upper surface of the cantilever, and the collar including a socket opening towards the lower surface of the cantilever which is registered with the through-hole provided in the cantilever, the second standard having an aperture therein respectively registerable with the through-hole provided in the cantilever and the socket formed in the collar mounted thereon, and a stud having a capped end and a free end, the free end thereof being introducible into the registered apertures respectively in the second standard and cantilever, and into the socket registered therewith, for thereby connecting the second standard to the second web of the fastener, the configured slot provided in the first standard having a T-shape.

3,970,400

DEFORMINGLY INTERLOCKED STRUCTURAL JOINT

Robert John Reid, Willowdale, Canada, assignor to Robert John Reid, Mississauga, Canada

Division of Ser. No. 377,786, July 9, 1973, Pat. No. 3,854,185. This application Sept. 9, 1974, Ser. No. 504,178

Int. Cl.² B25G *3/00;* **F16B** *9/00;* **F16L** *41/00*

U.S. Cl. 403—242 **4 Claims**

1. A structural joint between first and second metallic elements, said first element having at least one substantially planar flange which is capable of being deformed into the shape of at least a portion of a coil which has a free outer end and which has a width substantially greater than its thickness, said second element having at least one longitudinally extending rigid groove which is substantially arcuate in cross-section, each said groove having opposing edges which define an elongate longitudinally extending opening, the distance between said opposing edges being substantially less than the largest cross-sectional width of said arcuate groove, said flange being deformed within said groove to form at least a portion of a coil in said groove, the inner surface of the coiled flange defining an opening in the coiled flange, the width of said elongate opening being less than the cross-sectional width of the coiled flange thereby precluding withdrawal of the coiled flange from the groove, the outer surface of the coiled flange contacting the arcuate surface of said groove and having a sufficient degree of resiliency so that the coiled flange is urged to spring outwardly and exert an outward frictional binding force on the arcuate surface of said groove whereby said coiled flange is secured in said groove, the thickness of the coiled flange at any point along its coiled length being substantially the same as the thickness at a corresponding point along the length of the flange prior to its deformation in the groove.

3,970,401

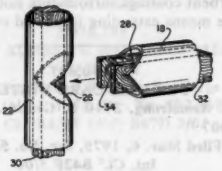
TUBULAR STRUCTURES

Donald Lubeck, 4 Ferry Lane, Barrington, R.I. 02806

Filed May 28, 1974, Ser. No. 474,073

Int. Cl.² F16B *12/04;* **F16L** *13/11*

U.S. Cl. 403—265 **4 Claims**



1. A free standing portable structure that is capable of supporting loads thereon, comprising a plurality of hollow tubular members that are interfitted to define a unitary construction, said members being formed of an oven baked resin impregnated paper, each of said members having a reinforcing core located therein that extends substantially the length thereof, the core of each member occupying less than the total volume therein to define an interior space therein, each member having portions of the core therein exposed at predetermined locations, the core of each member at an exposed location engaging an exposed core of an adjacent member for interengaging the members, a plurality of communicating channels being defined by the interior spaces of the members that are interengaged by the cores therein, and a polyurethane filler material extending throughout the interior of said members and occupying the spaces formed therein to positively interlock the members together in the unitary construction.

3,970,402

WEDGE-CLAMPED FLANGE JOINT

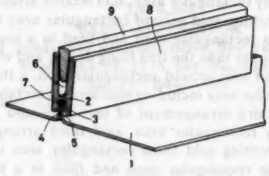
Mikio Yamashita, 1337 Sakonyama, Asahi, Yokohama, Japan

Filed Feb. 14, 1975, Ser. No. 549,927

Claims priority, application Japan, Aug. 7, 1974, 49-90580

Int. Cl.² F16D *1/00;* **F16L** *23/00*

U.S. Cl. 403—338 **4 Claims**



1. A device for jointing flanged members comprising in combination:

an H-shaped elongated beam body comprising a pair of parallel members and a transversely extending fulcrum member integrally connecting said parallel members together,

a first pair of substantially parallel legs of said H-shaped member, defining a first space for housing said flanged members, extending in a first direction away from said fulcrum member and upon one side thereof, and a second pair of substantially parallel legs of said H-shaped member, defining a second space for housing wedge means, extending in a second direction away from said fulcrum member and upon the opposite side thereof relative to said first pair of legs so as to be aligned with said first pair of legs,

said second pair of legs being substantially longer than said first pair of legs so as to provide a lever action with re-

spect to said first pair of legs, about said fulcrum when said wedge means is inserted within said second space, and said first and second spaces also being parallel to and encompassing the medial plane of symmetry of said H-shaped member, and

wedge means, having a length corresponding to that of said H-shaped elongated beam and adapted to be inserted into said second space, for pivoting and expanding both legs of said second pair of legs outwardly and away from each other about said fulcrum member and for simultaneously pivoting and converging both legs of said first pair of legs toward each other about said fulcrum member,

whereby both legs of said first pair of legs positively grip and joint said flanged members.

3,970,403

ANISOTROPIC ROAD SURFACE

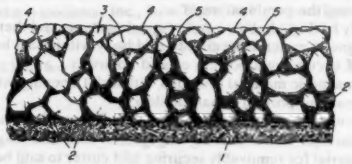
André Goyer, Lillebonne, and René Smadja, Notre Dame de Gravenchon, both of France, assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 390,278, Aug. 21, 1973. This application Apr. 18, 1975, Ser. No. 569,415

Claims priority, application France, June 1, 1973, 73.20091

Int. Cl.² E01C *3/00*

U.S. Cl. 404—27 **8 Claims**



1. An anisotropic road surface comprising a road-bed, a mastic binder superimposed on said road-bed consisting essentially of asphalt containing from about 10 to about 60 percent by weight of an inert filler having particle dimensions not greater than about 100 microns and a layer of gravel particles characterized by a relationship R of between 60 and 80%, R being

$$\frac{\text{apparent density}}{\text{actual density}} \times 100,$$

superimposed on said mastic binder, said particles being coated with a material which serves to assure close contact between said particles, but wherein spaces between the particles are not entirely filled by said binder, the dimensions of said particles being from about 2 mm to about 25 mm with the difference between the smallest and largest particles being no more than about 8 mm, the quantity of coated particles employed being such that after compaction the mastic binder fills the interstitial spaces between the particles of gravel to a thickness of from about 50 to about 95 percent of the total thickness of the final road surface.

3,970,404

METHOD OF RECONSTRUCTING ASPHALT PAVEMENT

Angelo W. Benedetti, 94 First St., Bedford, Ohio 44146

Filed June 28, 1974, Ser. No. 484,070

Int. Cl.² E01C *7/06*

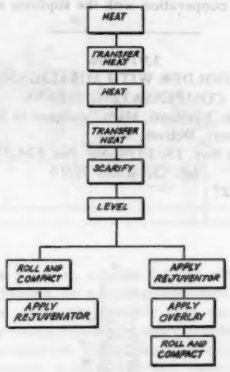
U.S. Cl. 404—77 **14 Claims**

1. A method of reconstructing asphalt pavement which comprises

a. heating the surface of the pavement with radiant energy until a temperature at the pavement surface within the range of about 225°F to about 325°F is attained, thereby softening said surface;

b. discontinuing the application of radiant energy;

c. subjecting the structurally undisturbed pavement to a heat soaking step during which heat previously applied to the pavement surface is conducted into the interior of the pavement, the soaking interval being of sufficient duration to elevate the temperature of the interior of the pavement to at least the softening temperature of the asphalt;



d. repeating steps (a) through (c) at least once, whereby the temperature of the interior of the pavement, to a depth of at least about one inch, is elevated to at least the softening temperature of the asphalt;

e. scarifying the asphalt pavement to a depth not exceeding the depth to which the asphalt has been heated to at least its softening temperature, and

f. providing said scarified asphalt pavement with a trafficable surface.

3,970,405

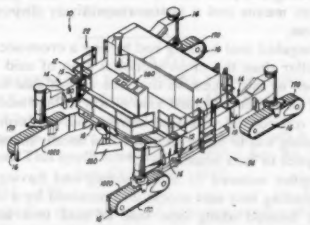
SLIPFORM PAVING APPARATUS

George William Swisher, Jr., Oklahoma City; Donald W. Smith, Edmond, and John F. Phillips, Oklahoma City, all of Okla., assignors to CMI Corporation, Oklahoma City, Okla.

Filed May 3, 1974, Ser. No. 466,686

Int. Cl.² E01C *19/12*

U.S. Cl. 404—105 **50 Claims**



1. A road building machine for forming finished grade concrete roads, comprising:

a frame assembly;

slipform means carried by the frame assembly for receiving the concrete and defining the sides of the road;

spreading means carried by the frame assembly for transversely equalizing the depth of the concrete initially received by the slipform means;

vibrator means carried by the frame assembly for vibrating and densifying the concrete being spread by the spreading means;

strike off assembly carried by the frame assembly disposed behind the vibrator means;

grout screed means carried by the frame assembly behind the strike off assembly for effecting an aggregate density gradient in the concrete; and

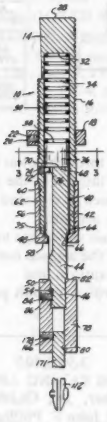
profile pan means connected to the frame assembly and held in spatial relationship therefrom for molding the concrete in cooperation with the slipform means.

3,970,406

TOOL HOLDER WITH MISALIGNMENT COMPENSATING MEANS

Louis A. Kubicek, Ypsilanti, Mich., assignor to Burr-Ban Tool Service Company, Detroit, Mich.

Filed Nov. 15, 1974, Ser. No. 524,323
Int. Cl.² B23B *51/16*
U.S. Cl. 408—127 **8 Claims**



1. The combination of a tool holder and a deburring tool comprising:

an elongated housing having a recess formed along its axis of elongation;

resilient means and a piston respectively disposed in said recess;

an elongated tool holding rod having a cross-sectional area smaller than the cross-sectional area of said recess disposed in said recess so that one end of said tool holding rod flatly abuts against said piston to bias said tool holding rod coaxial with said housing but to permit said tool holding rod to move to a position axially misaligned with respect to said housing;

a member secured to said housing and having a portion extending into said recess and received by a longitudinal slot formed along one side of said tool holding rod, wherein said member prevents rotation of said rod relative to said housing while permitting axial movement of said rod relative to said housing,

retaining means to retain said tool holding rod within said recess; and

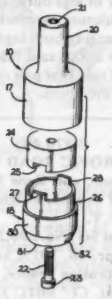
means to attach said deburring tool to said tool holding rod so that said deburring tool is coaxial with said tool holding rod, whereby compression of said resilient means permits said deburring tool to retract relative to said housing.

3,970,407

ROTARY CUTTER

Leroy E. Uffman, 5524 Elmer Ave., North Hollywood, Calif. 91601

Filed Nov. 25, 1974, Ser. No. 526,632
Int. Cl.² B23B *31/28*
U.S. Cl. 408—204 **1 Claim**



1. A rotary cutter for operating by a power rotating means comprising the combination of:

a body having a hollow interior opening at one end thereof;

a magnetic material secured to said body within said hollow and occupying a portion of said hollow;

said magnetic material provided with a slot opening into the remaining portion of said hollow;

a circular cutter insertably received into said remaining hollow portion releasably engageable with said magnetic material for removably securing said cutter to said body;

means cooperatively disposed between said magnetic material and said cutter for imparting rotary movement from said body to said cutter;

said rotary imparting means includes a pair of projections carried on said cutter engaged with said slot;

said body includes an extension adapted to be coupled to the chuck of said power means;

said cutter comprises a collar of reduced diameter insertable within said hollow and a portion of larger diameter extending away from said body;

said cutter includes a circular cutting edge defined by a circular rearwardly and outwardly diverging sloping surface; and

a threaded bolt securing said magnetic material to said body.

3,970,408

APPARATUS FOR USE WITH DELICATE FLUIDS

Edson Howard Rafferty, Excelsior, and Harold D. Kletschka, Minneapolis, both of Minn., assignors to Bio-Medicus, Inc., Minnetonka, Minn.

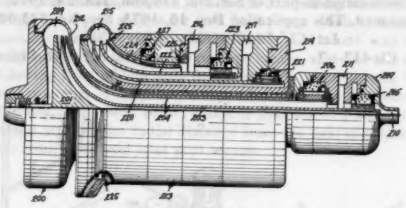
Continuation-in-part of Ser. No. 414,225, Nov. 9, 1974, which is a continuation-in-part of Ser. No. 204,980, Dec. 6, 1971, abandoned, which is a continuation-in-part of Ser. No. 886,137, Dec. 18, 1969, Pat. No. 3,647,324, which is a continuation-in-part of Ser. No. 678,265, Oct. 26, 1967, Pat. No. 3,487,784. This application Feb. 3, 1975, Ser. No. 546,347
Int. Cl.² F01B *13/00, 1/36*
U.S. Cl. 415—60 **10 Claims**

1. In rotary pumping apparatus for generating flow with an axial component, in combination:

1. a first bladeless pump structure including means mounting and driving at least one elongated pumping member for rotation about a first axis to cause fluid flow along said axis;

2. a second, bladeless hollow pump structure including means mounting and driving at least one elongated pump-

ing member for rotation about a second axis to cause fluid flow along said axis; and



3. means mounting said first pumping structure within said second pumping structure so that said first and second axes coincide and said fluid flows are in the same direction.

3,970,409

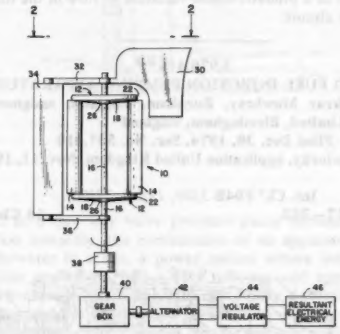
WIND POWER AND FLYWHEEL APPARATUS

George Luchuk, Millbrook, Canada, assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Mar. 26, 1975, Ser. No. 562,187

Int. Cl.[2] F03D *9/02*

U.S. Cl. 416—145 **3 Claims**



1. Flywheel apparatus having a variable moment of inertia comprising: a generally vertically directed elongated rotary shaft, an annular hub fixedly and coaxially carried about said shaft; a plurality of angularly spaced apart tubular spokes extending outward radially from said hub, said spokes being also upwardly inclined, making an angle of less than ninety degrees with the axis of said shaft, a toroidal hollow rim joined to the upper ends of said spokes in coaxial relationship about said hub in a manner enabling fluid communication between the interior of said spokes and the interior of said rim; the interiors of said spokes and said rim comprising a fluid-tight chamber; a heavy liquid in said chamber of a volulme for normally residing only in the interior of said spokes in the absence of rotation of said shaft; said liquid adapted to climb the interior walls of said upwardly inclined tubular spokes and reach the interior of said rim in response to the rate of rotation of said shaft exceeding a predetermined rate for increasing the moment of inertia of said flywheel apparatus.

3,970,410

ROTARY ACTUATORS SUITABLE FOR BLADED ROTORS

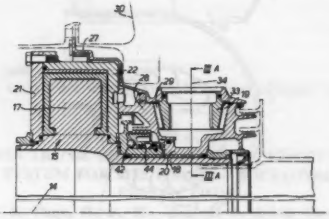
John Owen Hunt, Hucclecote, England, assignor to Dowty Rotol Limited, Gloucester, England

Filed Mar. 29, 1974, Ser. No. 456,209

Claims priority, application United Kingdom, Apr. 18, 1973, 18709/73

Int. Cl.[2] B64C *11/40*

U.S. Cl. 416—154 **9 Claims**



1. A rotary actuator, suitable for use with rotors having flow-varying blading, for effecting adjustment of the blading, including two relatively-rotatable and co-axially-disposed main actuator components, abutment means carried by the first of said components and displaceable axially with respect to that component, further abutment means carried by and fast with respect to the second of said components, axially-displaceable holding means associated with said displaceable abutment means, anti-friction elements through the intermediary of which said holding means and said displaceable abutment means are together carried by said first component in a manner so as to permit the axial displacement thereof with respect to that component but to prevent relative rotation between those means and that component, said holding means being constructed so that in its operative position it holds the displaceable abutment means out of mechanical engagement with respect to said further abutment means whereby relative rotational movement between the two components occurs when one of them moves in either one of its two directions of rotation, and controlling means co-operable with said holding means and operative when said holding means is inoperative, for loading the displaceable abutment means into mechanical engagement with the further abutment means at any relative rotational position of said components, said engagement being such as to prevent relative rotational movement of the components as would otherwise occur with movement of said one component in one of its two directions of rotation, and being such as to permit relative rotational movement of the components arising from movement of said one component in the other of its said two directions.

3,970,411

IMPELLERS FOR CROSS-FLOW FANS

Knut Olof Lennart Wallman, Fergas AB, Oskarsgatan 10, S-582 21 Linkoping, Sweden

Continuation-in-part of Ser. No. 347,340, April 2, 1973, abandoned. This application Aug. 30, 1974, Ser. No. 502,097

Int. Cl.[2] F04D *29/28*

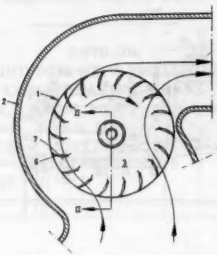
U.S. Cl. 416—178 **12 Claims**

1. A rotor for blowers, of the type comprising at least one disc that is normal and concentric to the rotor axis, and a number of elongated axially extending blades, each blade having a substantial curvature across its width that is uniform along most of its length and each blade being connected with said disc at a joint, said blades being disposed at uniform radial distances from the rotor axis and at equal angular distances from one another, each of said joints being characterized by:

A. an indentation in the blade defining a mounting strip which is elongated transversely of the blade and which

has a substantially lesser curvature along its length than said curvature of the remainder of the blade, the width of said strip being substantially equal to the thickness of the disc at the joint, and said strip being in flatwise offset relation to adjacent portions of the blade that have the first mentioned curvature; and

B. a slot in the disc opening to the periphery thereof and defining opposite spaced apart edges of the disc that overlie opposite faces of said strip and extend lengthwise



along it, said edges on the disc being so configured and spaced apart, relative to the thickness of the strip and its profile in longitudinal section, that one face of the strip is engaged with one of said edges only at its opposite end portions and the other face of the strip is engaged with the other of said edges at a zone spaced from its opposite end portions, so that the blade is insertable edgewise into the slot and when received therein has the mounting strip flexed along its length to thus be held by said edges against movement relative to the disc.

3,970,412

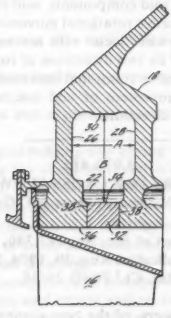
CLOSED CHANNEL DISK FOR A GAS TURBINE ENGINE

Cornelius V. Sundt, Windsor, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Mar. 3, 1975, Ser. No. 554,806

Int. Cl.² F01D *5/30, 5/08*

U.S. Cl. 416—219 R **4 Claims**



1. A rotor assembly for a gas turbine engine comprising:

a blade support disk having an upstream web, a downstream web and an arcuate plug joining the upstream web to the downstream web at the periphery of the disk, and having a plurality of essentially axial slot machined into the outer periphery of the disk; and

a plurality of compressor blades, one blade extending a radially outward direction from each axial slot in the disk.

3,970,413

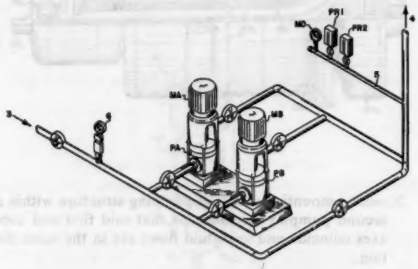
FLUID DISTRIBUTION APPARATUS AND METHOD

Francois Duveau, 74 Rue Michel Ange, Paris 16°, France

Continuation-in-part of Ser. No. 219,966, Jan. 24, 1972, abandoned. This application Dec. 10, 1973, Ser. No. 423,090

Int. Cl.² F04B *41/06, 19/00, 37/00*

U.S. Cl. 417—7 **8 Claims**



1. In a fluid distribution system including a fluid source and a fluid distribution circuit the improvement comprising:

booster pump means, said pump means including at least a first motor-pump group, said motor-pump group comprising a centrifugal pump controlled by a reversible motor and connected between the source and distribution circuit; and

means for selectively controlling said motor for rotation in a first direction to provide a first flow rate and in the second direction to provide a second flow rate in response to a predetermined variation of flow in the distribution circuit.

3,970,414

LIQUID FUEL INJECTION PUMPING APPARATUS

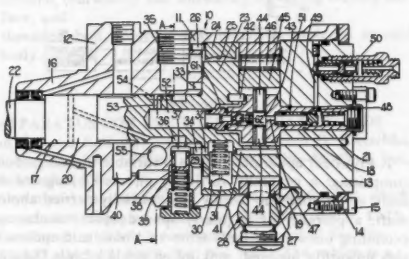
Dorian Farrar Mowbray, Burnham, England, assignor to C.A.V. Limited, Birmingham, England

Filed Dec. 30, 1974, Ser. No. 537,410

Claims priority, application United Kingdom, Nov. 11, 1974, 361/74

Int. Cl.² F04B *3/00, 19/02, 29/00*

U.S. Cl. 417—252 **15 Claims**



1. A liquid fuel pumping apparatus for supplying fuel at high pressure to a direct injection internal combustion engine, and comprising: a body part, a cylindrical rotor mounted within the body part and rotatable in synchronism with the engine, a transversely disposed bore formed in the rotor and a pair of pumping plungers housed in the bore, cam means for imparting inward movement to the plungers, first passage means in one part of the rotor communicating with said bore, inlet port means in said body part, a plurality of outlet ports formed in the body part and with which said first passage means registers in turn during successive delivery strokes of the plungers,

whereby fuel at high pressure is supplied to the outlets, a fuel feed pump for supplying fuel at low pressure, second passage means in another part of the rotor for registration with said inlet port means, control means for controlling the fuel flow to the inlet port means for said feed pump when said second passage means is in register therewith, and a one way valve incorporated in said second passage means, said one way valve allowing flow of fuel only from the feed pump to said bore, said one part of the rotor having a smaller diameter than said another part of the rotor, whereby said outlet ports are disposed at a smaller radial distance from the axis of rotation of the rotor than said inlet port means.

3,970,415

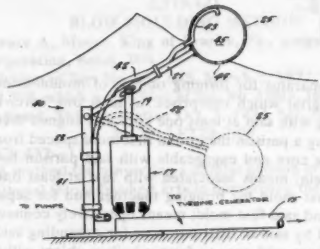
ONE WAY VALVE PRESSURE PUMP TURBINE GENERATOR STATION

Kaj Widecrantz, P.O. Box 72, and William R. Gatton, P.O. Box 222, both of Port Republic, N.J. 08241

Filed Apr. 10, 1975, Ser. No. 566,794

Int. Cl.[2] F04B *17/00, 35/00*

U.S. Cl. 417—332 **2 Claims**



1. In a one way valve pressure pump turbine generator station assembly, the combination of an apparatus installed underwater in a sea, a power station ashore installed with turbine generators, and a duct between said apparatus and said generators, said apparatus comprising a plurality of units each of which consist of a cylinder having inlet ports for receiving sea water, an outlet port for delivering said sea water into said duct, a piston inside said cylinder, a piston rod of said piston being connected to an arm pivoted at one end about a pivot pin on a stationary post, an opposite end of said arm having a hollow ball filled with air for floating on a surface of said sea, wherein one way valves are installed at said inlet and outlet ports and along said duct, wherein an air line communicates between pumps upon a shore and an interior of said ball, and an opening in a lower end of said ball for said sea water entering or leaving said ball.

3,970,416

REINFORCED MEMBRANE

William F. Mattson, Hinckley, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Filed July 14, 1975, Ser. No. 595,880

Int. Cl. B29h *5/18*

U.S. Cl. 425—52 **8 Claims**

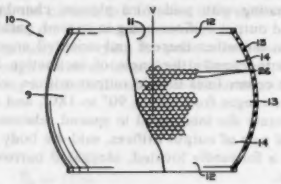
1. A curing membrane comprising:

a. a wall having an inside surface, and

b. a plurality of groups of adjoining ribs integrally molded to the inside surface of the wall wherein:

1. the groups of ribs collectively form a plurality of adjoining hexagons, and

2. each rib is a common side of two adjacent hexagons.



3,970,417

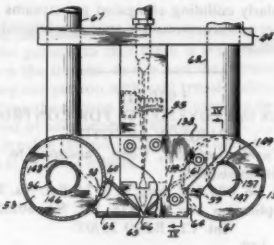
TWIN TRIPLE CHAMBERED GAS DISTRIBUTION SYSTEM FOR MELT BLOWN MICROFIBER PRODUCTION

Robert E. Page, Davis, Ill., assignor to Beloit Corporation, Beloit, Wis.

Filed Apr. 24, 1974, Ser. No. 463,461

Int. Cl.[2] B29D *7/20*

U.S. Cl. 425—72 S **9 Claims**



1. Apparatus adapted for melt blown microfiber production comprising:

A. a pair of elongated distribution conduit means in spaced relationship to each other, each such distribution conduit means defining therewithin an elongated first plenum chamber and having first input port means defined therein and a plurality of first output port means defined in longitudinally extending wall portions thereof,

B. a pair of elongated first plenum housing means in spaced relationship to each other, and to said pair of distribution conduit means, each one of said pair of first plenum housing being in a transversely spaced, adjacent, circumscribing associated relationship to a different one of each of said pair of distribution conduit means longitudinally therealong, each such first plenum housing means having second output port means defined in longitudinally extending wall portions thereof, and further having the opposed end regions thereof in fluid-tight engagement with the adjacent opposed end portions of the distribution conduit means so circumscribed thereby, each such so associated said distribution conduit and said first plenum housing means defining therebetween an elongated second plenum chamber,

C. a pair of elongated second plenum housing means, each one longitudinally extending along, and being interconnected in fluid-tight engagement with, a different one of said first plenum housing means, with opposed, longitudinally extending wall portions of each said second plenum housing means terminating on its associated respective first plenum housing means in laterally spaced relationship to at least one side of said second output port means thereof each one of said second plenum housing means

having a longitudinally elongated third plenum chamber defined therein and a longitudinally elongated output orifice defined therein, said second output port means communicating with said third plenum chamber, each one of said output orifices being in spaced, parallel relationship to the other thereof and oriented angularly so that cross sectionally the angle of inclination between respective center lines of said output orifices relative to each other ranges from about 90° to 180°, and an elongated separate die interposed in spaced relationship between said pair of output orifices, said die body —

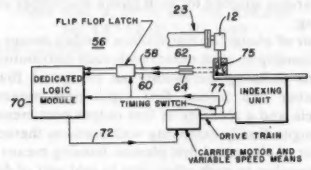
1. having a forwardly located, elongated narrow planar die face,
2. having a pair of forwardly tapered, exterior, opposed side walls adjoining said die face,
3. having a plurality of die orifices defined in said die face and adapted for simultaneous extrusion therefrom of a plurality of spaced, aligned strands of a melt,
4. having a melt input port, and
5. being adapted to distribute therewithin generally uniformly a melt entering said input port and exiting from said orifice plurality,

said die body being interposed between each of distribution conduit means and in spaced relationship to each one of said pair of elongated second plenum housing means, said first, second, and third plenum chambers coacting with said die body so that during operation of said apparatus, gas streams issuing from respective ones of said output port means define a pair of angularly colliding elongated gas streams such that the colliding occurs downstream in spaced relationship to said plurality of orifices.

3,970,418
APPARATUS IMPROVEMENTS FOR CONTROLLING PARISON LENGTH

Michael H. Turek, Ledyard, Conn., assignor to Monsanto Company, St. Louis, Mo.

Division of Ser. No. 495,627, Aug. 8, 1974, Pat. No. 3,943,214. This application Aug. 6, 1975, Ser. No. 602,270
Int. Cl.² B29D *23/03*
U.S. Cl. 425—140 **3 Claims**



1. In blow molding apparatus which includes:

a downwardly directed extrusion head having a vertically disposed annular orifice for shaping a freely pendant hollow thermoplastic parison therein;

a carrier supporting a plurality of molds generally adjacent said head;

drive means to move the carrier to consecutively position such molds beneath the head to receive portions of such parison for blow molding therein;

means responsive to a control signal for regulating the length of a parison section protruding beyond the cavity of successively presented molds; and

means for severing the parison from the orifice;

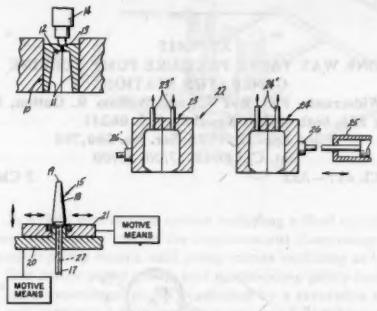
the improvement in said apparatus whereby the amount of said length is varied without causing a related change in the rheological properties of the thermoplastic forming the parison, which improvement comprises, in combination:

variable speed means for said drive means responsive to said control signal for changing the speed of said carrier to vary the rate at which consecutive molds are presented beneath the head.

3,970,419
APPARATUS FOR CONTROLLED PROCESSING OF BLOWN PLASTIC ARTICLES

Emery I. Valyi, 5200 Sycamore Ave., Riverdale, N.Y. 10471

Continuation-in-part of Ser. No. 473,580, May 24, 1974. This application June 14, 1974, Ser. No. 479,287
Int. Cl.² B29C *1/00, 17/00*
U.S. Cl. 425—242 B **35 Claims**



1. An apparatus for forming objects of moldable organic plastic material which comprises: at least one core; means cooperating with said at least one core and aligned therewith for providing a parison thereon; a first mold spaced from said at least one core and engageable with said parison having a cavity therein; means associated with said at least one core and said first mold for bringing together and for separating said core and said first mold; means operatively connected to and carried by said at least one core for expanding said parison away from said core to form a hollow object within said first mold; at least one second mold in spaced relationship to said first mold for adjusting the temperature of said hollow object; and means associated with at least one core for transferring said hollow object from said first mold to said second mold and retaining same in said second mold free from said core for adjusting the temperature of said hollow object.

3,970,420
ACTUATING ARRANGEMENTS FOR A CIGARETTE LIGHTER

Kenjiro Goto, Saitama, Japan, assignor to Mansei Kogyo Kabushiki Kaisha, Saitama, Japan

Filed Oct. 16, 1974, Ser. No. 515,213
Claims priority, application Japan, Oct. 18, 1973, 48-120844; Dec. 28, 1973, 49-395
Int. Cl.² F23Q *2/16*
U.S. Cl. 431—255 **17 Claims**

1. A lighter comprising

a casing having a cylindrical shape;

a fuel tank disposed within said casing;

a fuel spout valve fixed on said fuel tank;

a burner connected to said fuel spout valve through a connecting tube;

a valve opening member for controlling said fuel spout valve to issue fuel gas from said burner;

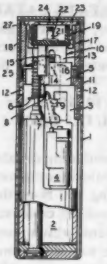
a spark gap provided around said burner;

an ignition mechanism housed in said casing for discharging a spark at the spark gap so as to ignite the fuel gas emitted by said burner;

an actuator supported to said casing and rotatable around a longitudinal axis of said casing;

means operatively associated with said actuator for transmitting the rotational movement of said actuator to said

ignition mechanism and to said valve opening member whereby to operate said ignition mechanism and said valve opening member; and



a mounting block located on said fuel tank and supported on said actuator for mounting said actuator rotatably around a longitudinally central axis of said casing.

3,970,421

BLOW MOULDING METHOD

Lawrence A. Moore, King of Prussia, Pa., assignor to Beloit Corporation, Beloit, Wis.

Division of Ser. No. 232,645, March 7, 1972, Pat. No. 3,852,398, which is a division of Ser. No. 3,003, Jan. 15, 1970, abandoned. This application Oct. 3, 1974, Ser. No. 512,062

Int. Cl.[2] F27D *3/00*

U.S. Cl. 432—11 **4 Claims**

1. A method for converting a tubular parison of thermoplastic material into a finished article comprising the steps of:

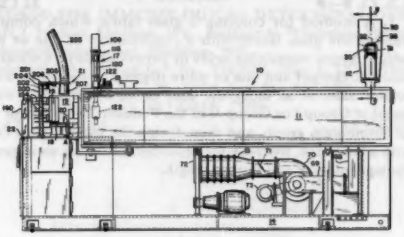
inserting said parison on a parison carrying device;

engaging the inner wall of said parison with said carrying device;

heating the parison to a forming temperature by moving the parison on the carrying device;

continuously conveying the parison and the carrying device through the oven to uniformly heat the parison;

inserting a transfer device into the oven;



moving the transfer device in the oven at the same velocity as the parison so that there is zero relative velocity between the transfer device and the parison;

grasping the parison with said transfer device

and lifting the parison from said carrying device during said period of zero relative velocity;

and removing the parison from the oven for transfer to said article forming means.

3,970,422

METHOD OF IMPROVEMENT IN COLORING GLASS FABRICS

Kozo Maeda, and Masakazu Date, both of Takatsuki, Japan, assignors to Toyo Boseki Kabushiki Kaisha, Osaka, Japan

Filed Nov. 5, 1974, Ser. No. 521,057
Claims priority, application Japan, Nov. 9, 1973, 48-126583
Int. Cl.[2] D06P 3/80
U.S. Cl. 8—8 22 Claims

1. A method for coloring a glass fabric which comprises treating the glass fabric with a combination of one or more sulfur-oxygen containing acids or peroxy acids or a water-soluble salt thereof and one or more organic or inorganic water-soluble salts of an inorganic acid or an organic acid with a metal of Group I or Group II of the Periodic Table and/or with an ammonium group, and then dyeing the treated glass fabric with a basic dye, whereby the resultant fabric has an improved dyeing property and loop strength.

3,970,423

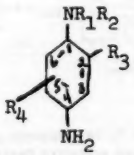
OXIDATIVE HAIR DYE COMPOSITIONS

Frederick Brody, New York, and Stanley Pohl, New Rochelle, both of N.Y., assignors to Clairol Incorporated, New York, N.Y.

Division of Ser. No. 186,475, Oct. 4, 1971, Pat. No. 3,884,627.
This application Feb. 6, 1975, Ser. No. 547,675
The portion of the term of this patent subsequent to May 20, 1992, has been disclaimed.
Int. Cl.[2] A61K 7/12
U.S. Cl. 8—10.2 15 Claims

1. A non-toxic oxidation hair dye composition comprising an aqueous carrier, as a para component from about .1% to 6% by weight based on the total weight of the composition of a compound of formula:

a.



or acid addition salts thereof and

b. from about 0.1% to 8% by weight based on the total weight of the composition of an oxidatively couplable component comprising a phenol which couples with said para component to give blue or violet compounds wherein:

R_1 is hydroxyalkyl;

R_2 is hydrogen or hydroxyalkyl;

R_3 is hydrogen, alkyl, alkoxy or halogen; and

R_4 occupies any one of the remaining positions on the benzene ring and is hydrogen, alkyl, alkoxy or halogen;

and wherein the alkyl or alkoxy contains 1 to 6 carbon atoms and the hydroxyalkyl contains 2 to 6 carbon atoms;

providing that R_2 is hydrogen when R_3 is alkyl, alkoxy or halogen;

and providing that at least two of R_2, R_3 or R_4 are other than hydrogen.

3,970,424

DURABLE PRESS TREATMENT BY ADDITION OF SODIUM DIHYDROGEN PHOSPHATE TO ALUMINUM SULFATE CATALYST

Russell M. H. Kullman, Metairie, and Robert M. Reinhardt, New Orleans, both of La., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Aug. 14, 1975, Ser. No. 604,853
Int. Cl.[2] D06M 13/40
U.S. Cl. 8—185 4 Claims

1. In a process for producing durable press textiles comprising impregnating cellulose-containing fabric with aqueous formulations containing an N-methylol amide crosslinking agent and aluminum sulfate catalyst, drying, and curing the fabric, the improvement which consists of adding sodium dihydrogen phosphate to said formulations to give finished fabrics with increased strength and no coloration.

3,970,425

FLAME RETARDANT PROCESS FOR TEXTILE MATERIALS INCLUDING PHOSPHORUS, HALOGEN AND ANTIMONY OXIDE

Robert Bruce Leblanc, and Destin A. Leblanc, both of Wickford, R.I., assignors to Cotton Incorporated, New York, N.Y.

Filed Apr. 15, 1974, Ser. No. 461,212
Int. Cl.[2] D06M 13/26, 13/44
U.S. Cl. 8—195 9 Claims

1. In a process wherein durable flame retardant properties are imparted to a web of cellulosic or protein fiber material by treatment thereof with a phosphorus-containing flameproofing agent which is affixed to the fiber in an amount of from about 0.5 to about 5 percent phosphorus by weight of the fiber and which has ion exchange capability and thereafter applying to said treated web a titanyl sulfate solution to improve the durability of the flame retardant properties, the improvement which comprises applying said phosphorus-containing flameproofing agent in correlation with antimony oxide and a flame retardant polymeric halogen-containing material selected from the group consisting of halogenated vinyl and vinylidene polymers and copolymers to affix on the fiber an amount of from about 0.5 to about 10 percent of the total of (phosphorus plus antimony plus halogen) by weight of the fiber whereby said phosphorus-containing flameproofing agent is applied in reduced amounts as compared to the treatment without correlation with said antimony oxide and flame-retardant polymeric halogen-containing material without substantially adversely affecting the flame retardant properties of the treated web.

3,970,426

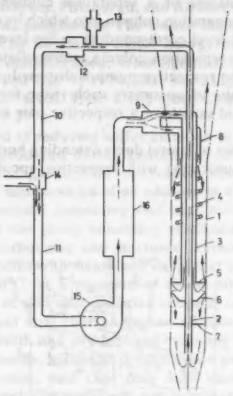
METHOD AND APPARATUS FOR THE PRESTERILIZATION OF PACKING MACHINES

Sven Olof Sören Stark, Rydsgard; Jan Axel Ingemar Rausér, and Irma Marita Rausér, both of Lomma, all of Sweden, assignors to Deering Milliken Research Corporation, Spartanburg, S.C.

Filed Mar. 11, 1975, Ser. No. 557,398
Claims priority, application Sweden, Mar. 18, 1974, 7435825
Int. Cl.[2] A61L 3/00, 13/06
U.S. Cl. 21—54 R 5 Claims

1. A method to pre-sterilize a packaging machine which supplies a product through a filling tube into a web of paper and forms the web of paper into a succession of product filled packages comprising the steps of: providing a supply of air

into the machine, converting a portion of the oxygen in the air to ozone by subjecting the air to radiation and recirculating



the ozone produced through the filling tube of the machine for pre-determined length of time.

3,970,427

PROCESS FOR REDUCING STICKING OF BLOOD CELLS TO GLASS IN BLOOD TESTING PROCEDURES

Vito M. Esposito, and Stanley B. Weinstein, both of Miami, Fla., assignors to American Hospital Supply Corporation, Evanston, Ill.

Filed Mar. 22, 1973, Ser. No. 343,973
Int. Cl.² G01N *33/16, 31/00*
U.S. Cl. 23—230 B **3 Claims**

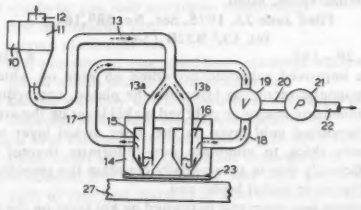
1. A blood testing procedure in which blood cells are disposed in close relation to glass surfaces, comprising the step of suspending said cells in a sterile physiological saline solution containing gelatin in a concentration range of approximately 0.001 to 2.0 percent, said gelatin being effective to reduce attraction forces between said blood cells and said glass surfaces.

3,970,428

METHOD AND APPARATUS FOR COLLECTING ATMOSPHERIC SAMPLES IN ATMOSPHERIC GEOCHEMICAL PROSPECTING

Anthony Rene Barringer, Willowdale, Canada, assignor to Barringer Research Limited, Rexdale, Canada

Filed Nov. 6, 1975, Ser. No. 629,264
Claims priority, application United Kingdom, Nov. 23, 1974, 50849/74
Int. Cl.² G01N *33/24*
U.S. Cl. 23—230 EP **10 Claims**



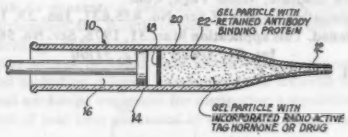
1. In a method of airborne geochemical prospecting wherein samples of atmospheric gases, vapours or particulates are collected and analyzed for content of predetermined elements or compounds, the improvement wherein contemporaneously with the collection of said samples, the atmosphere in the vicinity of the place of collection of said samples is monitored to determine whether the respective samples were uplifted by an updraft of air, and wherein samples respectively collected during periods of updrafts are separated from the remainder of said samples and are analyzed separately.

3,970,429

METHOD FOR IMMUNOLOGICAL DETERMINATIONS

Stuart J. Updike, Madison, Wis., assignor to Wisconsin Alumni Research Foundation, Madison, Wis.

Continuation-in-part of Ser. No. 356,092, May 1, 1973. This application Jan. 28, 1974, Ser. No. 437,135
Int. Cl.² G01N *31/06*
U.S. Cl. 23—230.6 **13 Claims**



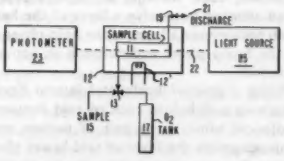
1. In a method for immunological determinations in which use is made of a volume of hydrophilic, insoluble, porous polyacrylamide gel particles containing proteins having binding sites, introducing a fluid to be tested into the volume whereby some of the binding sites become occupied, exposing the gel particles to radioactive tagged material, and then measuring the radioactivity of the unbound tagged material or bound tagged material, the improvement of regenerating the volume of gel particles for re-use in subsequent immunological determinations comprising the steps of exposing the volume of gel particles to acidic wash solution to effect detachment of material bound to the binding sites of the protein, washing the volume of gel particles to elute the unbonded material, washing the volume of gel particles with a highly volatile organic liquid which has an affinity for water for removal of aqueous medium, and then removing the organic liquid to return the gel particles to the dried and collapsed state for subsequent use in an immunological determination.

3,970,430

METHOD AND APPARATUS FOR NO_x ANALYSIS

John R. Reader, Jr., Middletown; James L. Seago, Wilmington, and James A. Williamson, Jr., Newark, all of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Oct. 17, 1974, Ser. No. 515,709
Int. Cl.² G01N *21/24*; G01J *1/42*
U.S. Cl. 23—232 R **15 Claims**



9. A method for measuring the concentration of NO_x in a sample gas comprising the following steps:

a. introducing a known volume of the sample gas into a gas-tight sample cell;

b. introducing at least about 2 atmospheres of an oxygen-containing gas into the cell to form a gas mixture with the sample gas;

c. controlling the temperature and pressure of the gas mixture;

d. passing detecting radiation of a wavelength between about 410 to about 600 nm. through the gas mixture in the cell, said detecting radiation being of a wavelength strongly absorbed by NO_2; and

e. measuring, at the same given time, the absorbance and the time rate of change of absorbance of the detecting radiation passing through the cell by the gas mixture in the cell, the sum of the measured absorbance and the measured time rate of change of absorbance being indicative of the initial NO_2 content of the sample gas.

3,970,431

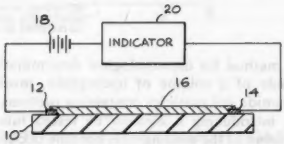
CARBON MONOXIDE GAS DETECTOR

Henry Wise, Redwood City, Calif., assignor to Stanford Research Institute, Menlo Park, Calif.

Continuation-in-part of Ser. No. 435,631, Jan. 23, 1974, abandoned. This application Mar. 31, 1975, Ser. No. 563,481

Int. Cl.² G01N 27/12, 31/00

U.S. Cl. 23—232 E **9 Claims**



1. A method of measuring the presence and the amount of carbon monoxide present in gases comprising

exposing a body consisting of silver oxide to said gases, and

measuring the change of electrical conductivity of said body of silver oxide in response to carbon monoxide in said gases.

3,970,432

MULTISTAGE VERTICAL EXTRACTOR FOR LIQUID-LIQUID COUNTERFLOW EXTRACTION

Hans-Martin Stönner, Schwalbach; Berthold Scholz, Oberursel, and Rainer Hartmann, Frankfurt am Main, all of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main , Germany

Filed Mar. 6, 1974, Ser. No. 448,510

Claims priority, application Germany, Mar. 8, 1973, 2311358

Int. Cl.² B01D 11/04

U.S. Cl. 23—270.5 T **1 Claim**

1. A multistage vertical extractor for liquid-liquid extraction with a heavy liquid phase and a light liquid phase, said extractor comprising:

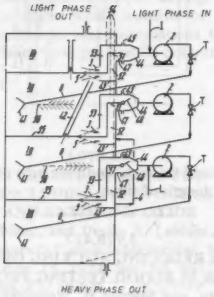
means including a plurality of vertically spaced bottoms for defining a multiplicity of vertically superposed separation compartments, each forming a respective one of the stages and adapted to receive a layer of the heavy phase upon each bottom and a layer of the light phase above the layer of the heavy phase and defining an apparent interface therewith;

means defining a pair of horizontal lateral liquid outlets opening above and below each of said bottoms and directly adjacent same, each pair of outlets respectively communicating with the layer of said heavy phase of one stage above the respective bottom and with the layer of said light phase of the next lower stage below the respective bottom;

a respective mixing pump associated with each of said pairs of lateral liquid outlets and having an intake side and a discharge side, said discharge side of each pump communicating with one of the separation compartments into which an outlet of the respective pair opens, each such pump having its intake side disposed at a level intermediate the bottoms of a separation column immediately above the separation column into which its discharge side opens, said level corresponding to the level of the interface of the separation column intermediate the bottoms of which the respective pump is disposed;

respective pairs of upcomers each rising from one of the lateral liquid outlets of a respective pair substantially to said level;

respective pairs of lateral ducts extending horizontally from and communicating with respective upcomers of a respective pair, each pair of ducts merging into a common chamber at the level of an intake side of a respective pump, said ducts of each pair having a common wall at the latter level defining a respective discharge edge, each of said chambers communicating with a respective intake side of the respective pump at the said level thereof;



a respective hinged valve flap on each discharge edge in the respective chamber at the respective intermediate level for controlling the relative flows of liquid from the outlets of each pair to the respective pump intake side, each discharge edge being disposed at a distance above the bottom of a respective compartment at least equal to the height of a phase to be retained therein upon termination of operation of said pumps.

3,970,433

RECORDING SURFACE SUBSTRATE

Gary Paul Warmka, Minneapolis, and James Dan Hill, Bloomington, both of Minn., assignors to Control Data Corporation, Minneapolis, Minn.

Filed June 23, 1975, Ser. No. 589,101

Int. Cl.² B32B 15/00

U.S. Cl. 29—194 **8 Claims**

1. An improved substrate providing an area on which a cobalt magnetic recording layer may be plated, comprising:

a. an inner non-magnetic polished nickel layer on the area;

b. a deposited gold layer on the inner nickel layer sufficiently thick to eliminate non-uniformity thereof and sufficiently thin to substantially maintain the smoothness of the inner nickel layer; and

c. an outer non-magnetic deposited nickel layer on the gold layer sufficiently thick to eliminate porosity therein and sufficiently thin to substantially maintain the smoothness of the gold layer.

3,970,434

PROCESS FOR REDUCING SULFUR IN COAL CHAR

Stanley J. Gasior, Pittsburgh; Albert J. Forney, Coraopolis; William P. Haynes, Pittsburgh, and Richard F. Kenny, Venetia, all of Pa., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Oct. 7, 1974, Ser. No. 512,819

Int. Cl.[2] C10L 9/10; C10J 3/00; C10B 57/00

U.S. Cl. 44—1 F 3 Claims

1. A method of reducing sulfur emission in the combustion of coal char produced during gasification of coal and of enhancing carbon gasification conversion comprising mixing coal particles and particles of an additive in a proportion of 1 to 5 weight percent respecting said coal, said additive being selected from the group consisting of alkaline earth oxides, hydroxides, carbonates and mixtures thereof, and reacting said coal particles with steam and oxygen at a temperature of 800° to 1,050°C. at a pressure of about 600 psig within a fluidized bed of said coal particles and said additive particles to produce said coal char having an alkaline earth oxide in mixture therewith and product gas including carbon monoxide, carbon dioxide, hydrogen, hydrocarbon gases and gaseous sulfur compounds, said coal char with said alkaline earth oxide having reduced sulfur content in respect to that of said coal; and burning said coal char in mixture with said alkaline earth oxide whereby gaseous sulfur oxide emissions are at least partially captured.

3,970,435

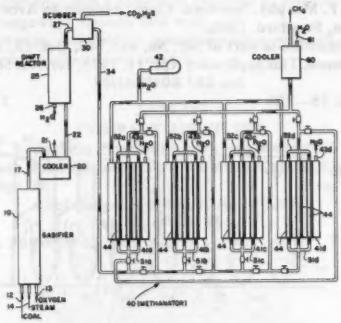
APPARATUS AND METHOD FOR METHANATION

Thomas J. Schultz, Toledo, and Klaus H. Hemsath, Sylvania, both of Ohio, assignors to Midland-Ross Corporation, Cleveland, Ohio

Filed Mar. 27, 1975, Ser. No. 562,796

Int. Cl.[2] B10J 7/00; C10J 1/00

U.S. Cl. 48—61 9 Claims



1. Apparatus for producing a synthetic gas from a feed gas in an exothermic reaction, said feed gas including reductants and synthetic gas, said apparatus comprising:

a first methanator vat;

a second methantor vat;

a first plurality of elongated heat exchange enclosures disposed within said first methanator vat;

a second plurality of elongated heat exchange enclosures disposed within said second methanator vat;

each heat exchange enclosure having an open inlet end, an open outlet end and a constant cross-section;

first conduit means connecting said feed gas to said inlet ends of said first plurality of heat exchange enclosures;

second conduit means connecting said outlet end of said first plurality of heat exchange enclosures with said inlet ends of said second plurality of heat exchange enclosures for transmitting said feed gas from said first plurality of heat exchange enclosures to said second plurality of heat exchange enclosures;

means for feeding said feed gas through said first conduit means at a temperature sufficient to react said reductants in an exothermic reaction and at a pressure sufficient to carry said feed gas through said first and second heat exchange enclosures at a predetermined velocity to produce said synthetic gas;

first catalytic insert means disposed within said first plurality of heat exchange enclosures dividing each enclosure into a plurality of ducts and having a first degree of reacitivity effective when said feed gas is contacted therewith to generate a generally constant quantity of heat throughout the length of said first plurality of heat exchange enclosures;

second catalytic insert means disposed within said second plurality of heat exchange enclosures dividing each second enclosure into a plurality of ducts and having a second degree of reactivity higher than said first degree of reactivity effective when said feed gas is contacted therewith to generate a generally constant quantity of heat throughout the length of said second plurality of heat exchange enclosures;

cooling means disposed only within each methanator vat and including a liquid surrounding the exterior of each heat exchange enclosure for dissipating a significant portion of said heat generated in said exothermic reaction.

3,970,436

GAS PRODUCER ARRANGEMENTS

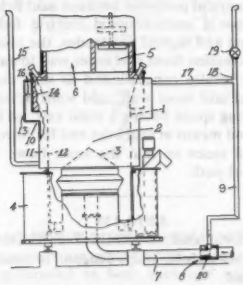
Gerald Sydney Victor Livemore, 71, 7th St., Parkmore, Sandton, Transvaal, South Africa

Filed Aug. 12, 1975, Ser. No. 603,971

Claims priority, application South Africa, Aug. 20, 1974, 74/5325

Int. Cl.[2] C10J 3/76, 3/68

U.S. Cl. 48—76 2 Claims



1. In a steam generating system for gas producers of the type including a combustion chamber having a grate for the introduction of an air blast with steam entrapped therein and an annular water jacket surrounding the combustion chamber, the improvement comprising:

an open inwardly directed vent pipe communicating with the lower part of the water jacket;

a steam exhaust line communicating at one end with the upper part of the jacket;

an air blast conduit opening to the grate in the combustion chamber, said exhaust line being connected at its other end to a juncture with said conduit for entry and transmission of steam with the air blast to the grate, the air blast conduit immediately downstream from said juncture of said conduit with said exhaust line defining a venturi throat; and

a safety valve in said exhaust line adapted to respond to temperature changes in the air blast conduit at said juncture.

3,970,437

ELECTRIC DUST SEPARATOR

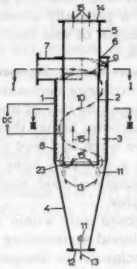
Alfred Erich Wibrandt Van Diepenbroek, Ermelo; Jan Hendrik Wormgoor, Amersfoort, and Cornelis Schilperoort, Ermelo, all of Netherlands, assignors to Bronswerk Apparatenbouw B.V., Nijkerk, Netherlands

Filed Mar. 4, 1974, Ser. No. 447,775

Claims priority, application Netherlands, Mar. 6, 1973, 7303156

Int. Cl.² B03C 3/14

U.S. Cl. 55—127 4 Claims



1. An apparatus of the dipole separator type for removing dust particles from a gas stream, comprising a metallic cylindrical inner wall constituting a first electrode; a coaxial cylindrical outer wall formed of an electrically insulating material; a second electrode carried by said outer wall and comprising a plurality of parallel, axially directed, electrically interconnected electrodes formed of a conducting material coated with an electrically insulating material to prevent the formation of a corona discharge; a source of electrical potential connected to said first and second electrodes for generating a difference in electrical potential between said first and second electrodes so that a unidirectional electric field is formed between said first and second electrodes, the intensity of said electric field increasing from said inner wall toward said outer wall and being locally concentrated at said outer wall but homogeneous at said inner wall; said walls defining therebetween a separating space having a main axis, an inlet end and an outlet end; and means at said inlet end for introducing a gas stream into said space so that the same flows through said space in a helical path.

3,970,438

DEAERATING ARRANGEMENT FOR DIALYZER

Claudio Sama, Mirandola, Italy, assignor to Sandoz Ltd., Basel, Switzerland

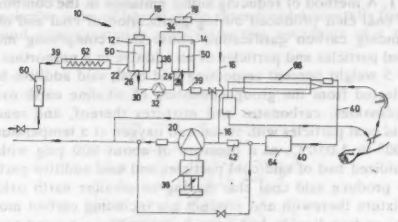
Filed Nov. 11, 1974, Ser. No. 522,896

Claims priority, application Italy, Nov. 15, 1973, 40103/73

Int. Cl.² B01D 19/00

U.S. Cl. 55—190 3 Claims

1. A deaerating arrangement for deaerating dialysis liquid in dialysis equipment of the type comprising a dialysis liquid feed line leading to a dialysis device and a dialysis liquid take-off line leading from the dialysis device, wherein the deaerating arrangement comprises a pair of deaerating chambers provided in series in the dialysis liquid feed line, the dialysis liquid outlet of the deaerating chamber first in series then leading to the dialysis liquid inlet of the deaerating chamber second in series, a feed back line leading from the head of the deaerating chamber second in series back to the base end of the deaerating chamber first in series through a first liquid flow-rate restrictor then being provided a deaerating line which leads off from the head of the deaerating chamber first in series through a second liquid flow-rate restrictor to an evacuation pump which, in operation, creates a negative pressure in the deaerating chamber first in series and withdraws air or gas formed in said first in series deaerating chamber, whereby the negative pressure created in the deaerating chamber first in series is transferred to the deaerating chamber second in series and whereby air or gas formed in the deaerating chamber second in series is withdrawn into the deaerating chamber first in series, the deaerating chamber further comprising a cylindrical housing having a base end into and from which the dialysis liquid inlet and dialysis liquid outlet pass and having a head end from which the deaerating line leads, a cylindrical divider chamber dividing said dialysis liquid inlet from said



dialysis liquid outlet mounted inside the cylindrical housing on said base end over said dialysis liquid outlet and terminating short of said head end, and a foraminous mass located in the volume defined between the cylindrical housing and the cylindrical divider chamber to encourage bubble formation under the negative pressure created by the evacuation pump as dialysis liquid passes through the dialysis liquid inlet into the deaerating chamber upwardly through the foraminous mass and then downwardly in the cylindrical divider chamber to the dialyser liquid outlet.

3,970,439

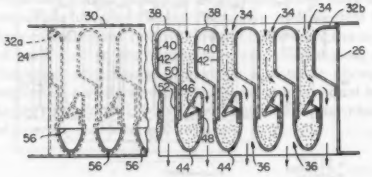
PARTICLE SEPARATOR

Joseph P. Murphy, Newtown, Conn., assignor to Avco Corporation, Stratford, Conn.

Continuation-in-part of Ser. No. 406,740, Oct. 15, 1973, abandoned. This application Apr. 11, 1975, Ser. No. 567,243

Int. Cl.² B01D 45/04

U.S. Cl. 55—306 3 Claims



1. A particle separator for separating and removing foreign particles from an airstream supplied to an engine air intake passage, said particle separator comprising:

an independent housing mounted adjacent said engine air intake passage, said housing being in communication with said engine air intake passage;

a plurality of channel assemblies mounted in parallel side-by-side relationship within said housing, adjacent assemblies defining separate tortuous passageways, each of said tortuous passageways including two turns each of less than 90°, each of said passageways being defined by said adjacent assemblies and having an air inlet and an air outlet, said air outlet being parallel to and displaced transversely from said air inlet, each of said channel assemblies comprising a curved forward wall portion at said air inlet and a reversely curved rear wall portion at said air outlet, one end of said curved forward wall portion and one end of said curved rear wall portion being

joined by a generally planar intermediate wall portion positioned in substantially parallel arrangement with the inlet portion of said tortuous passageway, the other end of said curved forward wall portion extending toward the interior of said separator and defining in combination with the intermediate wall portion of an adjacent assembly the side walls of an air inlet passageway, said other end of the curved forward wall portion further extending with a bend of less than 90° as a transverse wall section which continues to and effectively joins said one end of said reversely curved rear wall portion making thereby a closed interior cavity, the other end of said reversely curved rear wall portion extending toward the interior of said separator and terminating with an inward directed structural bend, the location of said wall terminating bend being such as to form in combination with the transverse wall section of the next adjacent assembly an open slot through which air flows from said air inlet passageway to said air outlet;

a plurality of particle collection chambers generally aligned with said air inlet passageway, each of said chambers being comprised of the curved interior side of each of said reversely curved rear wall portion, and being defined by two sidewalls and a top wall, the first of said sidewalls being that portion of the intermediate wall immediately adjacent said reversely curved rear wall, the second of said sidewalls being the interior side of the other end of said curved rear wall portion, and the top of said chamber comprising a slanting wall portion forming a juncture along one end with the second of said sidewalls, the other end of said slanting wall portion terminating in a lip, the space between said lip and said first sidewall of said chamber forming a restrictive entrance throat therebetween, whereby particle laden air enters said particle collection chamber under generally turbulent conditions;

a plurality of apertures in one wall of said housing, said apertures having a shape complementary to the contour of said collection chambers, each of said apertures communicating with a collection chamber to provide particle passageways through said wall; and

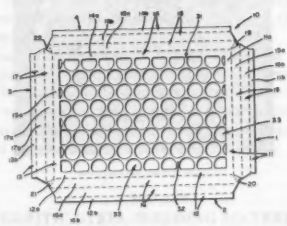
a scavenge manifold in communication with all of said particle collection chambers.

3,970,440

COMPACT AIR FILTER

John E. Copenhefer, Louisville, Ky., and Robert M. House, Wabash, Ind., assignors to United States Gypsum Company, Chicago, Ill.

Filed June 6, 1974, Ser. No. 476,957
Int. Cl.² B01D *46/10*
U.S. Cl. 55—501 **7 Claims**



1. A compact nestable air filter having a top surface and a bottom surface comprising:

A. a generally rectangular frame formed of a one piece suitably cut and scored blank comprising a plurality of interconnected frame members each comprising:

1. a coplanar flange having bottom and top coplanar flange members in juxtaposition, and

2. a flared flange disposed at an angle of less than 180° with respect to said coplanar flange and comprising bottom and top flared flange members, said bottom flared flange members being hingedly connected to said bottom coplanar flange members, said top flared flange members being hingedly connected to said bottom flared flange members, said top coplanar flange members being hingedly connected to said top flared flange members,

B. means connecting the ends of adjacent flared flanges together,

C. said one piece blank including a perforated bottom cover extending from said bottom coplanar flange members, and

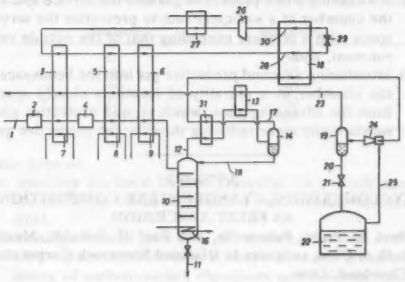
D. a filter member retained by said coplanar flanges.

3,970,441

CASCADED REFRIGERATION CYCLES FOR LIQUEFYING LOW-BOILING GASEOUS MIXTURES

Volker Etzbach, Munich; Wolfgang Förg, Grunwald, and Peter Grimm, Munich, all of Germany, assignors to Linde Aktiengesellschaft, Wiesbaden, Germany

Continuation-in-part of Ser. No. 489,245, July 17, 1974, abandoned. This application Jan. 13, 1975, Ser. No. 540,535
Claims priority, application Germany, July 17, 1973, 2336273
Int. Cl.² F25J *3/02*
U.S. Cl. 62—28 **16 Claims**



1. In a process for the at least partial liquefaction of a low-boiling gaseous mixture wherein the gaseous mixture under pressure is precooled in heat exchange with a vaporizing single-component refrigerant which flows in a first closed refrigeration cycle, purified during the course of the precooling step and, after the precooling step is subjected to a preliminary separation in a fractionating column to obtain a gaseous fraction, the improvement comprising:

precooling and partially liquefying to the extent of 40 to 65 volume % a closed cycle multicomponent gas refrigerant which flows in a second closed refrigeration cycle, in indirect heat exchange with said vaporizing single-component refrigerant,

completing the liquefying of said multicomponent gas refrigerant by cooling in one heat exchange stage, by expansion of resultant completely liquiefied multi-component refrigerant against itself, and

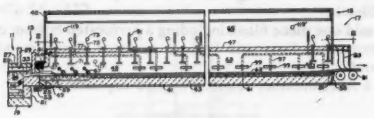
said expansion being conducted simultaneously in indirect heat exchange contact with the gaseous fraction obtained from said preliminary separation, to at least partially liquefy said gaseous fraction, said partial liquefaction being conducted at a temperature lower than the precooling step.

3,970,442

METHOD OF INTRODUCING PROTECTIVE ATMOSPHERE GASES INTO A GLASS FORMING CHAMBER

Joseph A. Gulotta, New Kensington, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed July 16, 1975, Ser. No. 596,495
Int. Cl.² C03B 18/02
U.S. Cl. 65—32 7 Claims



1. In the method of making flat glass wherein molten glass is delivered onto the surface of a pool of molten metal comprising a substantial amount of tin in an enclosed chamber providing headspace extending directly over the pool of molten metal and a service space extending over the headspace and separated from it by a ceiling that is permeable to gas, wherein the delivered glass is cooled and formed into a dimensionally stable, continuous sheet of glass while being advanced along the surface of the pool of molten metal, wherein the formed dimensionally stable, continuous sheet of glass is withdrawn from the pool of molten metal and from the enclosed chamber, and wherein sufficient protective gases are introduced into the enclosed chamber to prevent the substantial oxidation of the molten metal, the improvement comprising

a. introducing a first protective gas into the service space of the chamber at a sufficient rate to pressurize the service space with a pressure exceeding that of the outside environment, and

b. introducing a second protective gas into the headspace of the chamber at a plurality of locations closely spaced from the advancing glass, which second protective gas is substantially more reducing than the fist protective gas.

3,970,443

CYCLOHEXIMIDE-CYANOBENZENE COMPOSITIONS AS FRUIT ABSCISSION

Robert E. Holm, Painesville, and Paul H. Schuldt, Mentor, both of Ohio, assignors to Diamond Shamrock Corporation, Cleveland, Ohio

Filed Feb. 18, 1975, Ser. No. 550,525
Int. Cl.² A01N 9/22
U.S. Cl. 71—94 3 Claims

1. A method of harvesting mature fruit from a tree, which method comprises applying to the fruit locus an abscission-promoting amount of a composition consisting essentially of cycloheximide and tetrachloroisophthalonitrile and subsequently exerting a sufficient force on said fruit to remove same.

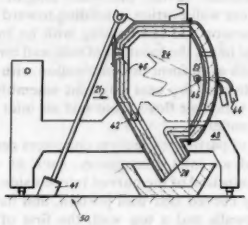
3,970,444

METHOD FOR POURING STEEL DURING CONTINUOUS CASTING

Karl Brotzmann; Hans Georg Fassbinder; Friedrich Karl Höfer, all of Sulzbach-Rosenberg, and Paul-Gerhard Mantey, Amberg, all of Germany, assignors to Eisenwerk-Gesellschaft Maximiliansnutte mbH, Sulzbac-Rosenberg, Germany

Filed Sept. 24, 1973, Ser. No. 400,423
Claims priority, application Germany, Sept. 27, 1972, 2247274
Int. Cl.² C21B 7/00
U.S. Cl. 75—46 10 Claims

1. A method of casting steel, wherein the inner surface of a lined tundish is pre-heated, the tundish filled with steel, and the steel is poured into at least one mold, the improvement comprising the steps of providing the tundish with a lining possessing a heat conductivity resistance of at least 0.25 m².h.°C/Kcal, bringing a discharge spout of the tundish which opens above a reference level of the metal bath in the tundish, prior to casting and during pre-heating of the tundish, into a position which occupies the lowest point of the inner surface of the tundish, heating the inner surface of the tundish to a temperature approximately corresponding to the temperature



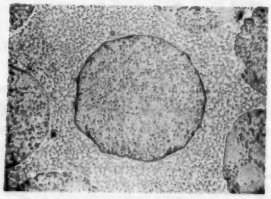
of the steel to be poured into the tundish immediately prior to casting, continuing the heating of the tundish to establish an approximately stationary thermal gradient between the inner and the outer surfaces of the tundish to substantially minimize heat transfer from the metal bath to the tundish, and bringing the tundish into its casting position prior to pouring the steel into the tundish.

3,970,445

WEAR-RESISTANT ALLOY, AND METHOD OF MAKING SAME

Preston L. Gale, Chillicothe; Eugene L. Helton, Peoria, both of Ill., and Robert C. Mueller, Mentor, Ohio, assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed May 2, 1974, Ser. No. 466,141
Int. Cl.² B22D 23/08
U.S. Cl. 75—0.5 B 4 Claims



1. A method for improving the hardness characteristics of an alloy consisting essentially of about 25 to about 61% by weight chromium, about 6 to about 12% by weight boron, and the balance iron comprising the steps of producing cast spheroidal particles thereof by streaming the molten alloy onto a hard surface thus breaking up the molten alloy into droplets and thereafter rapidly quenching and solidifying the molten alloy with a quench liquid while still in the droplet configuration.

3,970,446

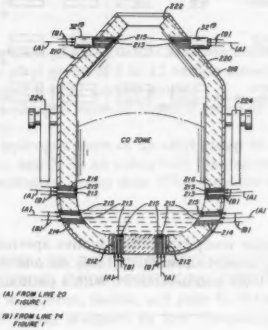
METHOD OF REFINING AN IRON BASE MELT

William A. Kolb, Forest Hills Borough, and Jack F. Sigh, Crafton Borough, both of Pa., assignors to United States Steel Corporation, Pittsburgh, Pa.

Division of Ser. No. 309,037, Nov. 24, 1972, Pat. No. 3,897,047, which is a continuation-in-part of Ser. No. 275,848, July 27, 1972, abandoned. This application Nov. 15, 1974, Ser. No. 524,104

Int. Cl.[2] C21C *5/32*, *5/34*

U.S. Cl. 75—60 25 Claims



1. A method of refining an iron base melt by blowing a gas stream at a predetermined flow rate and containing a suspended particulate solid into said iron base melt through a tuyere located beneath the surface of said iron base melt and having a tuyere inlet, said method including the steps of:

a. supplying said gas stream from a gas supply source at super atmospheric pressure through a closed supply system to said tuyere inlet at said predetermined flow rate for refining said iron-base melt;

b. maintaining the pressure of said gas stream so that the pressure of said gas stream at said tuyere inlet is less than the difference between said super atmospheric pressure of said gas supply source and the pressure drop in said gas stream resulting from the passage of said gas stream through said closed supply system;

c. injecting said suspended particulate solid into and suspending said suspended particulate solid in said gas stream at a particulate injection point in said closed supply system prior to entry of said gas stream into said tuyere inlet thereby increasing said pressure drop of said gas stream from said gas supply source to said tuyere inlet as a result of the passage of said gas stream and said suspended particulate solid through said closed supply system; and

d. increasing the pressure of said gas stream upstream of said particulate injection point to counteract said pressure drop in said closed supply system due to the injection and transport of said suspended particulae solid and thereby maintaining substantially constant said predetermined flow rate to said tuyere inlet.

3,970,447

FERRITIC STEEL WELDING MATERIAL

Francis Harold Lang, Oakland, N.J., assignor to The International Nickel Company, Inc., New York, N.Y.

Continuation of Ser. No. 11,298, Feb. 13, 1970, abandoned. This application Feb. 13, 1975, Ser. No. 549,530

Int. Cl.[2] C22C *38/06*, *38/08*

U.S. Cl. 75—124 4 Claims

1. An air meltable welding material particularly adapted for gas-shielded arc-welding of nickel alloy steels to produce welds having improved impact resistance at cryogenic temperatures, said welding material having a ferritic steel composition consisting essentially of about 7% to about 13% nickel, not more than about 0.3% manganese, not more than 0.09% carbon, not more than 0.15% silicon, not more than 0.05% aluminum, up to about 0.1% titanium, up to about 0.1% columbium, not more than 0.01% phosphorus, not more than 0.01% sulfur, not more than 0.05% oxygen, not more than 0.006% nitrogen, not more than 0.0003% hydrogen and the balance essentially iron.

3,970,448

LOW ALLOY DIE STEEL (TYPE F)

William Wilson, Jr., 3308 N. New England Ave., Chicago, Ill. 60634, and Charles W. Finkl, 2652 Sheridan Road, Evanston, Ill. 60436

Filed June 14, 1973, Ser. No. 369,922

Int. Cl.[2] C22C *38/40*

U.S. Cl. 75—129 2 Claims

1. In a method of making a die steel having a minimum required hardenability, and which requires

a. the following amounts of the following essential elements:

Element	Minimum
C	.50
Si	.15
Ni	.50
Cr	.50
Mo	.20

the steps of

b. selecting the Ideal Critical Diameter (D_I) which corresponds to the minimum required hardenability of the die steel,

c. melting a heat of steel from raw materials to yield at least alloy elements in the heat selected from the group consisting of carbon, nickel, chromium and molybdenum,

d. thereafter chemically analyzing the melt to determine the amount of each of said essential alloy elements therein,

e. thereafter making additions of carbon, silicon, nickel, chromium, and molybdenum to the heat as needed to ensure the presence in the heat of the minimum amount of each of said essential elements specified in step (a),

f. converting the amounts of the essential alloy elements carbon, silicon, nickel, chromium, molybdenum, and all other elements, which contribute to hardenability, to their equivalent in accordance with the formula

$$\log D_I = \log F_C + \log F_{Si} + \log F_{Ni} + \log F_{Cr} + \log F_{Mo} + \log F_x;$$

g. adding the D_I contributions for the individual alloy elements specified in step (f) to determine the total D_I value of the heat after the additions referred to in step (e) have been made to the steel, and, in the event the resultant D_I value is less than the required D_I value of step (b),

h. adding a hardenability make-up element or elements to the melt until the required D_I of step (b) is reached, said hardenability make-up elements being added in the order of

firstly, manganese, in an amount up to a maximum of about 2%, and

secondly, from the group consisting essentially of chromium, nickel and manganese.

3,970,449

HEAT TREATABLE NICKEL-BASE ALLOYS

James A. McGurty, Shillington, and Paul J. Scherbner, Boyertown, both of Pa., assignors to Kawecki Berylco Industries, Inc., Reading, Pa.

Filed June 13, 1975, Ser. No. 586,709
Int. Cl.² C22C *19/03*
U.S. Cl. 75—170 3 Claims

1. A heat treatable nickel-base alloy consisting essentially of between about 0.6 to 3.0 weight percent beryllium, between about 0.0 to 4.5 weight percent titanium, between about 0.0 to 4.5 weight percent zirconium, between about 0.0 to 4.5 weight percent hafnium, between about 0.01 to 1.0 weight percent of a rare earth element, and the balance nickel.

3,970,450

MODIFIED IRIDIUM-TUNGSTEN ALLOY

Chain T. Liu, and Henry Inouye, both of Oak Ridge, Tenn., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed July 16, 1975, Ser. No. 596,553
Int. Cl.² C22C *5/04*
U.S. Cl. 75—172 R 4 Claims

1. An iridium base alloy composition having enhanced impact resistance comprising by weight
20 to 50 ppm aluminum;
20 to 100 ppm iron;
5 to 20 ppm nickel;
50 to 100 ppm rhodium;
15 to 50 ppm thorium; and iridium as the balance.

2. The alloy according to claim 1 further comprising 0.3 wt. percent tungsten.

3,970,451

ELECTRICAL CONTACT MATERIALS AND METHODS OF MAKING THE SAME

Terrence Ardern Davies, Horton, England, assignor to Square D Company, Park Ridge, Ill.

Division of Ser. No. 384,157, July 30, 1973, Pat. No. 3,857,706. This application Nov. 25, 1974, Ser. No. 526,563
Claims priority, application United Kingdom, Aug. 25, 1972, 39666/72
Int. Cl.² C22C *5/06*
U.S. Cl. 75—173 R 7 Claims

1. An electrical contact material which consists of a mixture of silver and not more than 3.0 weight per cent of mercury and which includes not more than 3.0 weight per cent of tellurium.

3,970,452

CHARGED PARTICLE MODULATOR DEVICE AND IMAGING METHODS

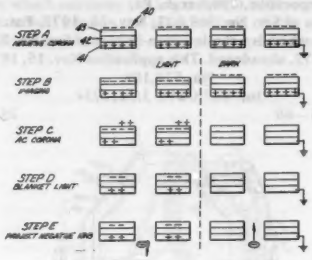
Alexander Chiang-Hsia Wu, Wayne, Mich., and Shou Ling Hou, Chagrin Falls, Ohio, assignors to Addressograph Multigraph Corporation, Cleveland, Ohio

Filed Aug. 30, 1974, Ser. No. 502,025
Int. Cl.² G03G *13/00, 5/00*
U.S. Cl. 96—1 R 21 Claims

1. A process for producing copies from an original comprising the steps of applying an electrostatic charge to a photoconductive surface of an apertured ion modulator, exposing said modulator to a pattern of light and shadow corresponding to said original, apply an alternating current to said modulator in the absence of a blanket light, flooding said modulator with a blanket light, projecting ions upon a conductive surface of said modulator opposite from said photoconductive surface whereby said ions are transmitted through said modulator in a pattern corresponding to said original,

creating a latent electrostatic image corresponding to said pattern upon a dielectric surface in the path of said transmitted ions, and

developing said latent electrostatic image,



said modulator comprising a conductive apertured surface uniformly coated substantially only on one side with an insulator layer and overcoated with a photoconductor.

3,970,453

IMAGING BY SELECTIVE STRIPPING OUT AREAS OF LAYER

Frank G. Belli, Webster, N.Y., and Peter P. Augostini, Graham, Tex., assignors to Xerox Corporation, Stamford, Conn.

Filed May 28, 1974, Ser. No. 473,956
Int. Cl.² G03G *13/22, 13/14*
U.S. Cl. 96—1.4 32 Claims

1. An imaging method comprising:

a. providing a member comprising a first layer of electrically insulating softenable material overlying a second layer of electrically insulating softenable material first portions of said first layer having migration material dispersed throughout, second portions of said first layer containing migration material at a lower density than said first portions, said second layer portions adjacent said first portions of said first layer being essentially free of migration material and second layer portions adjacent said second portions of said first layer containing migration material;

b. applying a receiver sheet to the free surface of said first layer of softenable material with at least sufficient heat and pressure to adhere the receiver sufficient to the member to allow selective stripping of the member by step (c) below; and

c. separating the receiver sheet from the member thereby stripping out portions of the first layer of softenable material, said portions of said softenable material containing substantially the same density of migration material, wherein migration material particles in the second layer adjacent the second portion of the first layer were migrated there through the interface between the first layer and the second portion of the first layer.

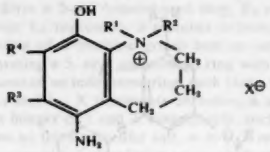
3,970,454

PHOTOGRAPHIC DEVELOPING AGENTS

Claude Fernand Marcel Gerbal, Bonneuil-sur-Marne, France, assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 30, 1974, Ser. No. 537,221
Claims priority, application France, Jan. 10, 1974, 74.00770
Int. Cl.² G03C *5/30;* C07D *215/00, 215/58, 215/12*
U.S. Cl. 96—29 D 8 Claims

1. A compound of the formula:



wherein

R^1 is an alkyl group of 1 to 12 carbon atoms,

R^2 is an alkyl group of 1 to 12 carbon atoms or a sulfoalkyl group of 1 to 12 carbon atoms,

R^3 is a hydrogen atom or an alkyl group of 1 to 12 carbon atoms,

R^4 is a hydrogen atom or an alkyl group of 1 to 12 carbon atoms, and $X^{\ominus}$ is an anion with the proviso that when R^2 is a sulfoalkyl group then $X^{\ominus}$ is the sulfo radical of R^2.

3,970,455

ELECTROSTATIC LITHOGRAPHIC PRINTING PROCESS UTILIZING HYDROPHILIZING COMPOSITION

Raymond R. Nadeau, Natick, and John E. Wyman, Lexington, both of Mass., assignors to Itek Corporation, Lexington, Mass.

Filed June 4, 1973, Ser. No. 366,953

Int. Cl.² G03F 7/02; G03G 5/08

U.S. Cl. 96—33 **24 Claims**

1. In a process for producing a lithographic printing plate comprising the steps of forming a latent electrostatic image on a photoconductive insulating recording layer comprising photoconductive zinc oxide, and developing this image with a hydrophobic toner forming an imagewise deposit on the recording layer, the improvement of contacting the portions of the recording layer which are not covered with the hydrophobic deposit with a hydrophilizing composition comprising a first reaction product of (1) phosphoric acid or one of the anions derived from such acid, (2) an organic alkylene amine compound, and (3) a hydrophilic metal cation selected from the group consisting of aluminum, titanium, zirconium and tin cations, to form a second reaction product with zinc ions from the zinc oxide which second reaction product of zinc ions with said hydrophilizing composition is substantially insoluble in said hydrophilizing composition and is wetted by water thereby repelling lithographic inks wherein said second reaction product is an insoluble salt containing zinc ions, phosphoric acid or one of the anions derived from such acid, an organic amine compound, and said hydrophilic metal cation.

3,970,456

METHOD FOR PREPARING A VIEWING-SCREEN STRUCTURE FOR A CRT HAVING TEMPERATURE-COMPENSATED MASK-MOUNTING MEANS, INCLUDING COOLING MASK DURING EXPOSURE

Tom Wendell Branton, Lancaster, Pa., assignor to RCA Corporation, New York, N.Y.

Filed Dec. 6, 1974, Ser. No. 530,404

Int. Cl.² G03C 5/00

U.S. Cl. 96—36.1 **7 Claims**

1. In a method for preparing a mosaic viewing screen for a cathode-ray tube, said tube comprising a faceplate panel including a viewing window and peripheral sidewalls, a mosaic viewing screen on the inner surface of said window, and a mask assembly including an apertured mask spaced from said window and a temperature-compensating mounting means for mounting said mask assembly in said panel; said method comprising

a. coating said inner surface of said window with a layer including a light-hardenable material,

b. heating said panel to temperatures above 50°C to dry said coating,

c. mounting said mask assembly in said heated panel, said mask assembly being at about room temperature,

d. and then, before said panel has cooled below 40°C, exposing said layer to actinic light from a small-area light source projected through said mask;

the improvement comprising, while the temperature of said panel is above 40°C, cooling said mounting means below 40°C to provide a desired spacing between said mask and said inner surface of said window.

3,970,457

AUTOMATIC REPLENISHMENT METHOD AND APPARATUS FOR PHOTOGRAPHIC PROCESSES

Harry N. Parsonage, Dayton, Ohio, assignor to The Mead Corporation, Dayton, Ohio

Filed Apr. 22, 1974, Ser. No. 462,663

Int. Cl.² G03C 5/26, 5/24, 5/38

U.S. Cl. 96—50 R **7 Claims**

1. A method for automatically replenishing chemical compositions in the developer tank, stop bath, hardener solution tank, bleach solution tank, and fix solution tank, which compositions are consumed at variable rates during a photographic process in which said compositions are used to develop photographic film, the compositions of said developer tank and bleach solution tank being image dependent by being consumed on the basis of how much imagery is being processed and the compositions of the stop bath, hardener solution tank, and fix solution tank being non-image and bulk dependent by being consumed on the basis of the amount of film being transported per unit time through the process, comprising:

a. extracting a sample from said bleach solution tank,

b. analyzing said sample from said bleach solution tank to determine the halogen concentration therein, whereby the variation of the imagery, which is directly proportional to the halogen concentration, is determined,

c. adjusting the rate of supply of said image dependent compositions in said developer tank and bleach solution tank in relation to said variation of the imagery and thereby maintain the desired concentration of said image dependent composition and, also during the processing,

d. extracting a sample from said fix solution tank,

e. analyzing said sample from said fix solution tank to determine the silver concentration therein, whereby the amount of film per unit time, which is directly proportional to said silver concentration, is determined, and

f. adjusting the rate of supply of said bulk dependent compositions in said stop bath, hardener solution tank, and fix solution tank in relation to said amount of film per unit tank and thereby maintain the desired concentrations of said bulk dependent compositions.

3,970,458

IMAGEWISE HARDENING WITH INERT TRANSITION METAL COMPLEX OXIDIZING AGENTS

Vernon Leon Bissonette, Brockport, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 189,289, Oct. 14, 1971, abandoned, and a continuation-in-part of Ser. No. 312,157, Dec. 4, 1972, Pat. No. 3,856,524. This application Nov. 28, 1973, Ser. No. 420,192

Int. Cl.² G03C 7/00, 5/26, 5/24, 5/30

U.S. Cl. 96—55 **28 Claims**

1. In a process of imagewise-hardening at least one layer of a photographic element which contains a crosslinkable colloid, the improvement comprising reacting an inert transition metal ion complex oxidizing agent having a coordination number of 6 and which is capable of existing in at least two valence states with a reducing agent in the presence of a

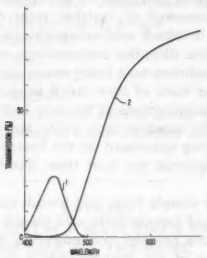
catalytic metal material or catalytic activated carbon material in a processing solution which is substantially free of silver halide solvents, wherein said catalytic material is provided in an imagewise distribution and wherein said oxidizing agent and said reducing agent are chosen so that the reaction products thereof are essentially noncatalytic for an oxidation-reduction reaction with said oxidizing agent and said reducing agent, and said oxidizing agent and said reducing agent are essentially inert to oxidation-reduction reaction in the absence of said catalytic material.

3,970,459

PROCESS FOR DEVELOPING A DIRECT REVERSAL SILVER HALIDE PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL

Tadaaki Tani, Minami-ashigara, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-Ashigara, Japan

Continuation-in-part of Ser. No. 281,674, Aug. 18, 1972, abandoned. This application Sept. 10, 1974, Ser. No. 504,775
Claims priority, application Japan, Aug. 19, 1971, 46-63229
Int. Cl.[2] G03C *5/24*
U.S. Cl. 96—64 **24 Claims**



1. A process of developing an image-wise exposed light-sensitive material which comprises processing a direct reversal silver halide photographic light-sensitive material comprising a support having coated thereon a light-sensitive layer formed by applying to said support a silver halide photographic emulsion comprising:

1. cubic silver halide grains having fogging nuclei therein provided by adding a strong reducing agent to said emulsion and ripening said emulsion, and
2. (a) an electron acceptor which is capable of receiving photoelectrons and also which is capable of acting as a development accelerator and bearing atoms capable of being positively charged in a developer solution; and
   b. (i) an electron acceptor capable of receiving photelectrons and (ii) a development accelerator containing atoms capable of being positively charged in a developer solution;

in an aqueous solution of a hydrophilic colloid; with a developer solution containing a developing agent having at least one phenolic hydroxy group, the pH of said developer solution being at least 11.

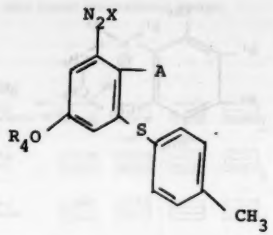
3,970,460

DIAZOTYPE COMPOSITION

Petar Jagrovic, Bern, Switzerland, assignor to Multitec AG, Switzerland

Filed Mar. 15, 1974, Ser. No. 451,556
Claims priority, application Switzerland, Mar. 28, 1973, 4459/73
Int. Cl.[2] G03C *1/54*
U.S. Cl. 96—91 R **8 Claims**

1. A diazotype composition containing a 2-substituent-3-thio-5-alkoxybenzene diazonium compound of the formula:



wherein

A is $-OR_4$ or $-N(CH_3)COOR_5$;

R_4 is a lower alkyl radical and

R_5 is an alkyl radical having 1–8 carbon atoms, or a benzyl radical and

X is an anion.

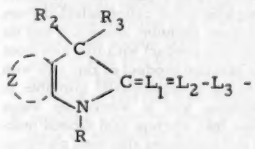
3,970,461

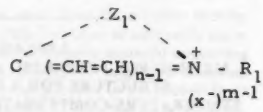
FOGGED, DIRECT-POSITIVE SILVER HALIDE EMULSION CONTAINING CARBOCYANINE DYE HAVING INDOLENINE NUCLEUS

Keisuke Shiba; Masanao Hinata; Akira Sato; Akira Ogawa, and Hirotetu Kato, Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Continuation-in-part of Ser. No. 185,819, Oct. 1, 1971, abandoned. This application July 6, 1973, Ser. No. 376,997
Claims priority, application Japan, Oct. 1, 1970, 45-86241
Int. Cl.[2] G03C *1/28, 1/36, 1/08*
U.S. Cl. 96—101 **14 Claims**

1. A direct positive silver halide photographic emulsion, in which the silver halide grains thereof have been fogged to maximum density, containing from one mg to 200 mg per Kg of said emulsion, of a dye represented by the following formula:





wherein R and R_1 are selected from the group consisting of an alkyl group, an allyl group, a substituted alkyl group selected from the group consisting of a 2-hydroxyethyl group, a 3-hydroxypropyl group, a 2-methoxyethyl group, a ketaacetoxyethyl group, a gamma- acetoxypropyl group, a carboxylalkyl group, a sulfoalkyl group, and a phenylethyl group, an aryl group, and a substituted aryl group selected from the group consisting of a methoxyphenyl group and a chlorophenyl group, at least one of said R and R_1 being a carboxylalkyl group or a sulfoalkyl group; R_2 and R_3 are selected from the group consisting of an alkyl group, an aralkyl group, and an allyl group; L_1 is selected from the group consisting of a methine group and an atomic group capable of combining with R,

R_2 or R_3 to form a 5- or 6-membered ring; R_2 represents a methine group; L_3 represents a member selected from the group consisting of a methine group and an atomic group capable of forming a 5- or 6 -membered ring with R_1, or with a 3,3-substituent of an indolenine ring, such that a ring may be formed by L_1 and L_3; X represents an anion; *n* and *m* each represents an integer of 1 and 2, respectively, such that when said dye forms an intramolecular salt, *m* is 1; Z represents an atomic group capable of completing an unsubstituted benzene ring, an unsubstituted naphthalene ring, or a lower alkyl-, lower alkoxy-, chloro-lower alkoxy- carbonyl- substituted benzene ring; and Z_1 represents a non-metallic atomic group capable of completing a 5- or 6-membered heterocyclic ring, said ring being a member selected from the group consisting of a 4-methylthiazole ring, a 4-phenylthiazole ring, a 5-methylthiazole ring, a 5-phenylthiazole ring, a 4,5-dimethylthiazole ring, a 4,5-diphenylthiazole ring, a 4-(2-thienyl)-thiazole ring, an unsubstituted thiazole ring, an unsubstituted benzothiazole ring, a 4-chlorobenzothiazole ring, a 5-chlorobenzothiazole ring, a 6-chlorobenzothiazole ring, a 7-chlorobenzothiazole ring, a 4 -methylbenzothiazole ring, a 5-methylbenzothiazole ring, a 6-methylbenzothiazole ring, a 5-bromobenzothiazole ring, a 6-bromobenzothiazole ring, a 5-phenylbenzothiazole ring, a 6-phenylbenzothiazole ring, a 4-methoxybenzothiazole ring, a 5-methoxybenzothiazole ring, a 6-methoxybenzothiazole ring, a 5-iodobenzothiazole ring, a 6-iodobenzothiazole ring, a 4-ethoxybenzothiazole ring, a 5-ethoxybenzothiazole ring, a tetrahydrobenzothiazole ring, a 5,6-dimethoxybenzothiazole ring, a 5,6-dimethylbenzothiazole ring, a 5-hydroxybenzothiazole ring, a 6-hydroxybenzothiazole ring, an unsubstituted alpha-naphthothiazole ring, an unsubstituted beta-naphthothiazole ring, an unsubstuttuted beta, beta-naphthothiazole ring, a 5-methoxy-beta, beta-naphthothiazole ring, a 5-ethoxy-beta-naphthothiazole ring, an 8-methoxy-alpha-naphthothiazole ring, a 7-methoxy-alpha-naphthothiazole ring, a 4′-methoxythionaphthene-7′, 6′, 4′, 5-thiazole ring, an unsubstituted oxazole ring, a 4-methyloxazole ring, a 5-methyloxazole ring, a 4-phenyl-oxazole ring, a 4,5-diphenyloxazole ring, 4,5-dimethyloxazole ring, 4-ethyloxazole ring, a 5-phenyloxazole ring, an unsubstituted benzoxazole ring, a 5-chlorobenzoxazole ring, a 5-methylbenzoxazole ring, a 5-phenylbenzoxazole ring, a 6-methylbenzoxazole ring, a 4,6-dimethylbenzoxazole ring, a 5-methoxybenzoxazole ring, a 5-ethoxybenzoxazole ring, a 5-bromobenzoxazole ring, a 5-iodobenzoxazole ring, a 6-methoxybenzoxazole ring, a 5-hydroxybenzoxazole ring, a 6-hydroxybenzoxazole ring, an unsubstituted selenazole ring, a 4-methylselenazole ring, a 4-phenylselenazole ring, a benzoselenazole ring, a 5-chlorobenzoselenazole ring, a 5-methoxybenzoselenazole ring, a 5-hydroxybenzoselenazole ring, a tetrahydrobenzoselenazole ring, an alpha-naphthoselenazole ring, a beta-naphthoselenazole ring, unsubstituted thiazoline ring, a 4-methylthiazoline ring, an unsubstituted oxazoline ring, an unsubstituted pyridine ring, an unsubstituted 2-pyridine ring, a 5-methyl-2-pyridine ring, an unsubstituted 4-pyridine ring, a 3-methyl-4-pyridine ring, an unsubstituted quinoline ring, an unsubstituted 2-quinoline ring, a 3-methyl-2-quinoline ring, a 5-ethyl-2-quinoline ring, a 6-chloro-2-quinoline ring, an 8-chloro-2-quinoline ring, a 6-methoxy-2-quinoline ring, an 8-hydroxy-2-quinoline ring, an 8-methyl-2-quinoline ring, an unsubstituted 4-quinoline ring, a 6-methoxy-4-quinoline ring, a 7-methyl-4-quinoline ring, an 8-chloro-4-quinoline ring, an unsubstituted 1-isoquinoline ring, a 3,4-dihydro-1isoquinoline ring, an unsubstituted 3-isoquinoline ring, a 3,3-dimethylidolenine ring, a 3,3,5-trimethylindolenine ring, a 3,3-dimethyl-5-methoxy-indoleneine ring, a 3,3-dimethyl-5-ethoxycarbonyl-indolenine ring, a 3,3,5,6-tetramethyl-indoleneine ring, a 3,3-diethyl-indolenine ring, a 3,3-dibenzylindolenine ring, a 3,3-diallylindolenine ring, a 3,3-dimethyl-5-cyanoindolenine ring, a 3,3-dimethyl-6-cyanoindolenine ring, a 3,3-dimethyl-5-chloroindolenine ring, a 3,3-dimethylbenzoindolenine ring, a 3,3-dimethylbenzoindolenine ring, an unsubstituted imidazole ring, a 1-alkyl-imidazole ring, a 1-alkyl-4-phenyl-imidazole, a 1-alkyl-4,5-dimethylimidazole ring, an unsubstituted benzimidazole ring, a 1-alkylbenzimidazole ring, a 1-aryl-5,6-dichlorobenzimidazole ring, a 1-alkyl-alpha-naphthoimidazole ring, a 1-aryl-beta-naphthiomidazole ring and a 1-alkyl-5-methoxy-alpha-naphthoimidazole ring wherein for Z_1 of oxazole or benzoxazole any benzoxazole moiety contains a greater number of aromatic rings than an oxazole moiety.

3,970,462
SELF SETTING MOLDING PROCESS

Neil W. Stillman, Madison, Ohio, assignor to Diamond Shamrock Corporation, Cleveland, Ohio

Continuation-in-part of Ser. No. 355,879, April 30, 1973, abandoned. This application Feb. 25, 1974, Ser. No. 445,558

Int. Cl.² B28B *7/34*

U.S. Cl. 106—38.35 **6 Claims**

1. In a process for the production of a mold which comprises forming a mixture of an aggregate with 1 to 10 percent by weight of a liquid alkali metal silicate having an SiO_2 to alkali metal oxide ratio of about 2.0:1 to 3.3:1, shaping the resulting mixture, and curing the resulting shape at room temperature, the improvement comprising adding to said mixture from about 20 percent to about 40 percent by weight of the silicate of a curing agent prepared by refluxing three moles of glycerin and one mole of glacial acetic acid and distilling off volatiles at reflux until the temperature in the still head drops.

3,970,463
GLASSES AND GLASS-CERAMICS AND PRODUCTS MADE THEREFROM

Jerry L. Planchock, Toledo; Daniel R. Stewart, Maumee, and Thomas W. Brock, Toledo, all of Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio

Division of Ser. No. 229,959, Feb. 28, 1972, Pat. No. 3,841,950, which is a continuation-in-part of Ser. No. 146,664, May 25, 1971, abandoned. This application Apr. 26, 1974, Ser. No. 464,713

Int. Cl.² C03C *3/22, 3/04*

U.S. Cl. 106—39.7 **35 Claims**

1. A thermally crystallizable glass capable of being thermally in situ crystallized to a glass-ceramic which is thermally stable at temperatures of about 1,500°F for at least 1000 hours and maintains its modulus of rupture of at least about 10,000 psi at such temperatures for said times, said glass consisting essentially of the following ingredients:

Ingredients	Weight Percent
SiO_2	55 – 80
Al_2O_3	12 – 27
Li_2O	3.2 – 7.6
Nucleating Agent	3 – 9

wherein said nucleating agent is a mixture of $TiO_2 + ZrO_2$, wherein the ZrO_2 does not exceed 3 weight percent, but is at least 0.5 weight percent, wherein the SiO_2/Al_2O_3 molar ratio is from 4 to 10 and wherein

a. when the SiO_2/Al_2O_3 molar ratio is from 4 to less than 5, the Li_2O/Al_2O_3 molar ratio is from 0.75 to 0.97; and

b. when the SiO_2/Al_2O_3 molar ratio is from 5 to 7.5, the Li_2O/Al_2O_3 molar ratio is from 0.65 to 0.97; and

c. when the SiO_2/Al_2O_3 molar ratio is more than 7.5 and less than 9, the Li_2O/Al_2O_3 molar ratio is from 0.8 to 0.97; and

d. when the SiO_2/Al_2O_3 molar ratio is more than 9 and up to 10, the Li_2O/Al_2O_3 molar ratio is from 0.87 to 0.97.

3,970,464
SILICA-FREE, ALKALI METAL-FREE AND LEAD-FREE SEALING GLASSES

James Allen Sheil, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Feb. 10, 1975, Ser. No. 548,265
Int. Cl.[2] C03C *3/14, 3/12, 3/30*
U.S. Cl. 106—47 R 12 Claims

1. A sealing glass composition that is lead free, alkali metal free and free of silica which consists essentially of the following components in the indicated mole percent ranges based upon the total composition:

Component	Mole Percent
ZnO	50–55
B_2O_3	35–45

the total mole percent amount of ZnO and B_2O_3 being not greater than about 95 mole percent and the balance of said composition alternatively consisting of (a) about 5 mole percent of GeO_2, or (b) about 5 mole percent of Al_2O_3 together with at least one of the following:

Component	Mole Percent
CaO	0–5
CuO	0–5
GeO_2	0–5
V_2O_5	0–2.5
MgO	0–5.

3,970,465
METHOD OF COMPOSING A MIXTURE FOR LEAD GLASS

Mathijs Maria Hendrikus Houben, Eersel, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed May 7, 1975, Ser. No. 575,189
Claims priority, application Netherlands, May 7, 1974, 7406083
Int. Cl.[2] C03C *3/10, 3/04*
U.S. Cl. 106—53 2 Claims

1. A method of manufacturing a glass mixture intended for the manufacture of lead glass, comprising the steps of:

providing a mixture of glass-making ingredients comprising quartz sand, felspar, and other components consisting essentially of the following in percentage by weight:

SiO_2	20–65		ZnO	0–12
B_2O_3	0–25		PbO	12–60
Na_2O	0–16	combined	Al_2O_3	0.5–5
K_2O	0–16	>1.5	As_2O_3 and/or	0–1
CaO	0–4		Sb_2O_3	
BaO	0–8		MnO	0–1

wherein said quartz sand has a particle size no more than 100 μm and said felspars have a particle size no more than 100 μm;

producing a glass melt from said mixture substantially free from gas inclusions.

3,970,466
CHEMICALLY STABLE OPTICAL GLASS

Marga Faulstich, Mainz, Germany, assignor to Jenaer Glaswerk Schott & Gen., Mainz, Germany

Filed July 18, 1975, Ser. No. 597,092
Claims priority, application Germany, July 24, 1974, 2435555
Int. Cl.[2] C03C *3/10, 3/08, 3/04*
U.S. Cl. 106—54 6 Claims

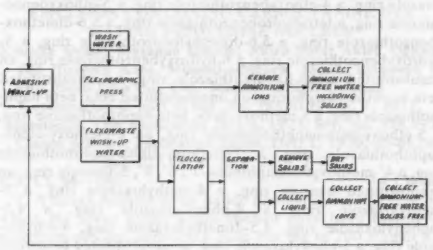
1. Optical glass, $nd = 1.650 \pm 2 \times 10^{-3}$ and $vd = 55.5 \pm 1.0$, having a high chemical stability and a sufficiently low tendency toward crystallization that it can be manufactured in a continuous tank melting process into gobs, pressed components, and other formed articles as a mass-produced glass, said glass consisting essentially of, in percent by weight:

SiO_2	33.0 ± 0.5
B_2O_3	11.6 ± 0.5
BaO	36.6 ± 1.0
La_2O_3	14.0 ± 2.5
ZrO_2	4.0 ± 2.5
As_2O_3 or Sb_2O_3	0 – 0.5.

3,970,467
METHOD FOR MAKING CORRUGATING ADHESIVES WITH FLEXOGRAPHIC PRESS WASTE WATER

John E. Voight, Fenton; Edward M. Bovier, Dellwood, and Clarence J. Liebman, St. Louis County, all of Mo., assignors to Anheuser-Busch, Incorporated, St. Louis, Mo.

Continuation of Ser. No. 358,540, May 9, 1973, abandoned. This application Nov. 4, 1974, Ser. No. 520,243
Int. Cl.[2] C08L *3/00;* C02B *1/40*
U.S. Cl. 106—213 5 Claims



1. In a method for preparing starch-based corrugating adhesives comprising mixing a carrier portion containing an aqueous slurry of cooked starch with a secondary portion containing an aqueous slurry of raw starch, the improvement comprising, as the water in said secondary portion, flexographic press water prepared by the steps of

A. washing a flexographic printing press with water,

B. collecting the wash water, and

C. removing ammonium ions from the wash water.

3,970,468
SULFUR EMULSION IN BITUMINOUS MATERIAL

Claude Garrigues, Noisy-le-Grand; Jean Baptiste Signouret, and Claude Chambu, both of Billere, all of France, assignors to Societe Nationale des Petroles d'Aquitaine, Paris, France

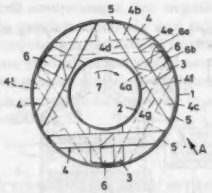
Filed May 14, 1974, Ser. No. 469,769
Claims priority, application France, May 24, 1973, 73.18842
Int. Cl.[2] C08L *95/00;* E01C *5/12*
U.S. Cl. 106—274 12 Claims

1. The method of producing a stable emulsion of sulfur in a material selected from the group consisting of bitumens, asphalts, pitches and tars, wherein 15 to 45 parts by weight of molten sulfur are mixed at about 125°C to about 160°C with 100 parts by weight of said material under stirring, the stirring being carried out so as to disperse the molten sulfur, throughout said material, in the form of droplets the dimensions of which are between about 0.5 and 10 microns, the fluid mass thus obtained being then formed to a required shape and allowed to cool until it becomes solid.

3,970,469
EXTRACTION TOWER

Siegfried Matusch, Braunschweig, Germany, assignor to Braunschweigische Maschinenbauanstalt, Braunschweig, Germany

Filed Nov. 7, 1975, Ser. No. 629,846
Claims priority, application Germany, Nov. 30, 1974, 2456774
Int. Cl.² C13D *1/12*
U.S. Cl. 127—5 **6 Claims**

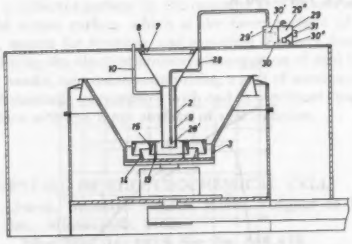


1. An extraction tower comprising a tower housing, a central shaft rotatably supported in said housing, feed advance means secured to said central shaft and spaced along the length of the shaft to provide spacings between adjacent feed advance means, and baffle means secured to said tower housing inside thereof at such locations that the baffle means reach into said spacings between adjacent feed advance means, said baffle means comprising a plurality of elongated baffle elements, means securing each of said elongated baffle elements to said tower housing at a plurality of points inside of the tower housing to reinforce the latter, said elongated baffle elements being distributed about the inside of the tower to substantially surround said central shaft, said baffle elements having a longitudinal axis and two sections twisted in opposite directions relative to said longitudinal axis.

3,970,470
CENTRIFUGE

Günter Trojan, Wattenscheid, and Richard Böhm, Herne, both of Germany, assignors to Hein, Lehmann A.G., Dusseldorf, Germany

Filed Oct. 18, 1974, Ser. No. 516,001
Int. Cl.² B04B *3/00*; C13F *1/10*
U.S. Cl. 127—19 **16 Claims**

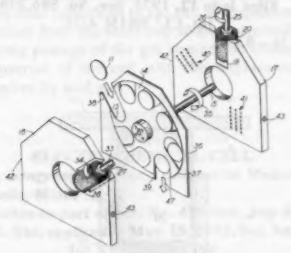


1. A sugar centrifuge for viscous fillmasses, comprising a conical sieve basket rotatable about a vertical axis and having an upwardly directed outlet, an unperforated accelerating cup connected to said sieve basket at the smallest diameter thereof, said accelerating cup comprising at least one lower deflecting ring fastened coaxially on the bottom of said accelerating cup, a plate concentrically covering the bottom of said accelerating cup, a coaxial upper deflecting ring fastened to said plate, distancing rods connected to said plate to provide variable spacing, a box rotatable along with said cup, a coaxially double walled feed pipe having a lower open end communicating with the space between the upper and lower deflecting rings, a gas conducting pipe extending into the space between the two walls of the double walled feed pipe, another conducting pipe extending into the interior of said double walled feed pipe, a container having the shape of communicating tubes and connected with said other conducting pipe, said container being adapted to be filled with a liquid, a float switch in said container and means connected with said pipes for regulating the amount and temperature of water and steam supplied thereto.

3,970,471
METHODS AND APPARATUS FOR TREATING WAFER-LIKE ARTICLES

Robert B. Bankes, Reading, and Walter W. Gladney, Kutztown, both of Pa., assignors to Western Electric Co., Inc., New York, N.Y.

Filed Apr. 23, 1975, Ser. No. 570,690
Int. Cl.² B08B *1/04*
U.S. Cl. 134—6 **17 Claims**



13. A method for treating wafer-like articles comprising:
inserting the articles into article-receiving slots in a substantially planar article-conveying member;
conveying the articles between a pair of opposed, substantially parallel immobile plates disposed sufficiently close to the member to laterally retain the articles in the slots;
exposing the entire extent of one face of each of the articles, in succession, through a first aperture in one of said plates to a first treating operation while the article is supported by the other of said plates; and
exposing the entire extend of the opposite face of each of the articles, in succession, to a second treating operation through a second aperture in said other of said plates disposed at a different position than the first aperture along the path of conveyance while the article is supported by said one of said plates.

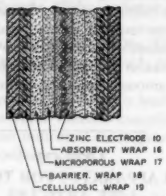
3,970,472
RECHARGEABLE BATTERY WITH ZINC NEGATIVE AND DENDRITE BARRIER

John Steffensen, West Caldwell, N.J., assignor to McGraw-Edison Company, Elgin, Ill.

Filed July 8, 1975, Ser. No. 593,965
Int. Cl.² H01M *43/02*, *3/00*
U.S. Cl. 136—3 **12 Claims**

1. In a rechargeable battery having an alkaline electrolyte, and zinc-negative and positive electrodes wherein dendrite growths from the zinc electrode during charge tend to short the battery: a dendrite barrier across the entire face of the zinc electrode including a porous absorbent layer between the zinc electrode and the barrier and a confining separator layer across the outer face of the barrier capable of diffusing the electrolyte but not the dissolved zinc, said barrier comprising a cloth substrate of a porous flexible material, and porous

metal deposited on and through said substrate of a low hydrogen over-voltage which on contact with a zinc dendrite reacts



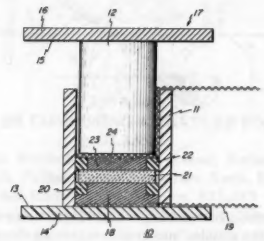
with the same to dissolve the dendrite and prevent the same from shorting the adjacent electrode.

3,970,473

SOLID STATE ELECTROCHEMICAL CELL

Walter L. Roth, Schenectady, and Gregory C. Farrington, Elnora, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed June 12, 1975, Ser. No. 586,220
Int. Cl.² H01M 4/36
U.S. Cl. 136—83 R **3 Claims**



1. A solid state electrochemical cell comprises a casing, an anode positioned within the casing, the anode selected from the class consisting of lithium, lithium as an amalgam or alloys of lithium with indium or thallium, a cathode positioned within the casing, the cathode comprising a non-stoichiometric lithium compound in which the composition can be expressed by the formula $Li_xM_yO_z$ wherein the subscript x is in the range $0<x<1$, M is a cation which can change its oxidation state in accordance with the value of x, the subscript y is in the range $0<y\leq 3$, and z has a value such that electrical neutrality of the compound is established, and a solid lithium-sodium aluminated electrolyte positioned within the casing between the anode and cathode, the solid lithium-sodium aluminate electrolyte having an approximate composition of LiNaO. $9Al_2O_3$ of which 1.3 to 85.0 percent of the total alkali ion content is lithium.

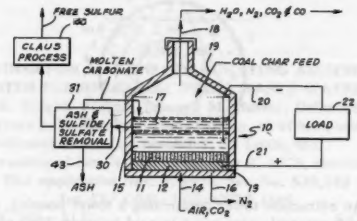
3,970,474

METHOD AND APPARATUS FOR ELECTROCHEMICAL GENERATION OF POWER FROM CARBONACEOUS FUELS

Michael Anbar, Palo Alto; Donald F. McMillen, Menlo Park; Robert D. Weaver, Palo Alto, and Paul J. Jorgensen, Cupertino, all of Calif., assignors to Stanford Research Institute, Menlo Park, Calif.

Filed Aug. 11, 1975, Ser. No. 603,591
Int. Cl.² H01M 8/18
U.S. Cl. 136—86 A **3 Claims**

1. In a method of generating electromotive force wherein a supply of a coal, charcoal, coal char or CO carbonaceous fuel is maintained in contact with the electrolyte of a first electrochemical cell having (1) a molten metal anode made up of lead, antimony or bismuth, (2) an electrolyte made up of a molten salt maintained at temperatures above the melting point of the anode metal, and (3) a cathode adapted to receive an oxygen-containing gas and supply the oxygen to the electrolyte in reduced form, thereby generating the desired electromotive force, wherein during operation of the cell the molten anode metal is oxidized with the oxygen in the molten electrolyte as the carbonaceous fuel simultaneously reduces the formed metal oxide back to the molten metal condition, and wherein the gases discharged from the cell comprise CO,



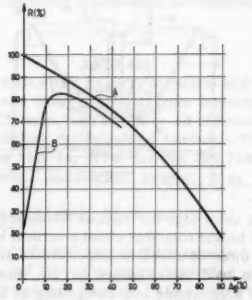
CO_2, water vapor and any nitrogen supplied along with the oxygen, the improvement which comprises maintaining an excess of the carbonaceous fuel in the molten electrolyte such that, of the discharged CO and CO_2 gases, the CO predominates, recovering the CO gas so discharged and employing the same as the carbonaceous fuel supplied to a second electrochemical cell generally operated in the general fashion as the first cell except that the supply of CO to the second cell is so regulated that of the discharged CO and CO_2 gases, the CO $_2$ predominates.

3,970,475

PRIMARY CELL, IN WHICH THE POSITIVE ACTIVE MATERIAL IS SILVER CHROMATE

Gerard Gerbier, and Jean-Paul Rivault, both of Poitiers, France, assignors to Saft-Societe des Accumulateurs Fixes et de Traction, Romainville, France

Filed Oct. 22, 1974, Ser. No. 516,962
Claims priority, application France, Oct. 29, 1973, 73.38506
Int. Cl.² H01M 6/00
U.S. Cl. 136—100 R **7 Claims**



1. Primary non-aqueous electrolyte cell having high efficiency of discharge at high temperatures above 70° to at least 90°C. in which the positive active mass is silver chromate, characterized in that the positive active mass contains between 5% and 30% by weight of silver powder.

3,970,476
ELECTROCHEMICAL CELL CONTAINING CORROSION INHIBITOR

Pierre Cerfon, Freneuse, France, assignor to Compagnie Industrielle des Piles Electriques "Cipel", Levallois-Perret, France

Continuation of Ser. No. 436,095, Jan. 24, 1974, abandoned. This application June 26, 1975, Ser. No. 590,711

Claims priority, application France, Jan. 30, 1973, 73.03235

Int. Cl.² H01M 17/00

U.S. Cl. 136—103 **3 Claims**

1. An electric cell comprising a zinc negative electrode, a manganese dioxide positive electrode and saline electrolyte, said electrolyte comprising a mixture of starch, zinc chloride solution, ammonium chloride solution and ascorbic acid, said ascorbic acid serving as a corrosion inhibitor, and wherein said ascorbic acid is present in said mixture in a concentration ranging from 700–900 mg/l.

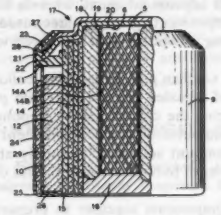
3,970,477
MERCURY TRAP AND CONTACT

Frank Ciliberti, Ossining, N.Y., assignor to P. R. Mallory & Co., Inc., Indianapolis, Ind.

Filed Dec. 7, 1971, Ser. No. 205,582

Int. Cl.² H01M 6/06

U.S. Cl. 136—107 **2 Claims**



1. An electrochemical cell comprising positive and negative terminal means connected respectively to a cathode and an amalgamated anode wherein said amalgamated anode comprises a hollow cylinder of amalgamated metal, with an alkaline electrolyte disposed therebetween, wherein said anode is provided with an active surface which comprises the outer surface of said cylinder and which is juxtaposed to said cathode and a collector surface on the opposite side of said anode from said active surface which is the inner surface of said cylinder, means for isolating and segrating mercury droplets formed during the electrochemical consumption of said amalgamated anode, said means comprising a grid of amalgamable metal substantially coextensive with and in electrical conductive contact with the inner surface of said cylinder.

3,970,478
VENTING OF ELECTROCHEMICAL CELL

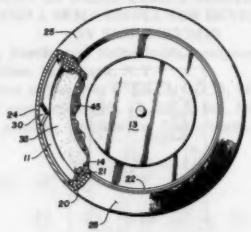
Edsel O. Jurva, Brooklyn Center, Minn., assignor to Medtronic, Inc., Minneapolis, Minn.

Filed Mar. 14, 1975, Ser. No. 558,418

Int. Cl.² H01M 2/04

U.S. Cl. 136—133 **8 Claims**

1. An electrochemical cell comprising, an inner cup shaped electrode terminal having side walls and an upper lip, a disc shaped electrode terminal having edges, sealing means made of a liquid impervious material positioned in part between the cup shaped terminal and the disc shaped terminal separating the same in an insulating manner from one another, said sealing means including a body portion and a sleeve portion with the body portion positioned between the upper lip of the cup shaped terminal and the edges of the disc shaped terminal, an outer cup shaped cover member having a lip and side walls, said outer cup shaped cover member being fitted over the inner cup shaped electrode terminal and with the lip thereof bearing against the sleeve portion of the sealing member and clamping the disc shaped terminal and the inner cup shaped terminal together in an assembled and sealed relationship, and a series of openings in said inner cup shaped electrode terminal adjacent the body portion of the sealing member to provide a shortened path for hydrogen gas generated by the cell under severe load conditions of the cell by displacement of the sealing member from the inner cup shaped electrode terminal and permitting passage of the gas around the sealing member from the interior of the cell with the displacement of the sealing member by said gas.



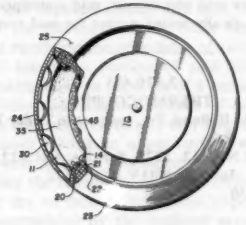
3,970,479
ELECTROCHEMICAL CELL

Wendell L. King, Isanti, Minn., assignor to Medtronic, Inc., Minneapolis, Minn.

Continuation-in-part of Ser. No. 485,960, July 5, 1974, abandoned. This application Mar. 12, 1975, Ser. No. 557,754

Int. Cl.² H01M 2/04

U.S. Cl. 136—133 **8 Claims**



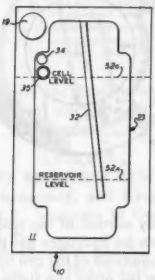
1. An electrochemical cell comprising an inner cup shaped electrode terminal having side walls and an upper lip, a disc shaped electrode terminal, sealing means being made of a liquid impervious and gas permeable material positioned in part between the cup shaped terminal and the disc shaped terminal separating the same in an insulating manner from one another, said sealing means including a body portion and sleeve portion with the body portion positioned between the upper lip and side walls, an outer cup shaped cover member fitted over the inner cup shaped electrode terminal and having a lip bearing against the sleeve portion of the sealing member and clamping the disc shaped terminal and the inner cup shaped terminal together in an assembled and sealed relationship, and an opening in said inner cup shaped electrode terminal extending to the atmosphere and covered by said sealing means having a surface area sufficient to provide a shortened path for hydrogen gas generated by the cell under the most severe load conditions of the cell through the sealing member from the interior of the cell.

3,970,480

AIR-VENTED LEAKPROOF BATTERY CELL

Jacob E. Schmidt, Little Falls, N.J., assignor to McGraw-Edison Company, Elgin, Ill.

Continuation-in-part of Ser. No. 376,328, July 5, 1973, abandoned. This application Feb. 19, 1975, Ser. No. 550,981
Int. Cl.² H01M 10/36
U.S. Cl. 136—177 8 Claims



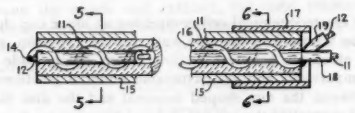
1. A vented battery cell having a liquid electrolyte and cathode and anode elements, said cell being capable of being tilted in any direction from a vertical to a horizontal position without leakage of electrolyte, comprising a container for said elements and electrolyte, a cover sealed to said container, a vent reservoir mounted on said cover and having a capacity less than that required to hold all the electrolyte in said cell, said reservoir having an opening between it and said cover at a corner of the reservoir, and a vent tube in said reservoir extending through one end wall thereof adjacent said corner and from said wall approximately to a diagonal corner of the reservoir opposite said one corner, said container and reservoir being hermetically sealed except for said vent tube.

3,970,481

THERMOCOUPLE

Edward R. Stroik, Holland, Pa., assignor to Tudor Technology, Inc., Horsham, Pa.

Filed Nov. 12, 1975, Ser. No. 631,222
Int. Cl.² H01V 1/00, 1/02
U.S. Cl. 136—230 6 Claims



1. A temperature responsive device comprising
a pair of elongated dissimilar metallic wires having an inner measuring terminal portion at which said wires are in contact providing a signal at elevated temperatures,
one of said wires having an insulating covering thereon and one of said wires being helically wound onto the other,
a surrounding enclosure extending along said wires of compacted self-sustaining normally non-electrically conductive material, and
an exterior cover of readily combustible material extending along said enclosure.

3,970,482

SIMPLIFIED METAL TREATING COMPOSITIONS FORMED FROM PRECURSOR COMPONENTS

Walter H. Gunn, Painesville, Ohio, assignor to Diamond Shamrock Corporation, Cleveland, Ohio

Continuation-in-part of Ser. No. 298,646, Oct. 18, 1972, abandoned. This application Sept. 9, 1974, Ser. No. 504,383
Int. Cl.³ C23F 7/26
U.S. Cl. 148—6.2 10 Claims

1. The method of preparing a pulverulent-zinc-containing coating composition, having enhanced compositional stability at a pH below about 5.6 and above about 4.5, which composition is adapted for treating metal substrates and providing corrosion resistance thereto, wherein said coating composition is prepared to contain hexavalent chromium from a pulverulent-zinc-free chromic acid component (A), and to further contain zinc from a pulverulent zinc component (B), which method comprises:

1. preparing said chromic acid component (A) at a pH of from 3 to below about 5 and with reduced forms of chromium, if such exist, being substantially below 5 percent of the component hexavalent chromium, by:
   a. establishing an aqueous composition containing chromic acid in solution, said chromic acid being present in amount sufficient to provide for a pH in water of below 3.0;
   b. adjusting the pH of said aqueous composition to from 3 to about 5, inclusive, with basic, compatible and acid soluble pH adjustment agent, wherein compatibility of said pH adjustment agent provides cured coatings from said coating composition of enhanced water insolubility; and,
   c. admixing xanthan gum hydrophilic colloid to the composition of adjusted pH and after said pH adjustment, for preparing the chromic acid component (A);
2. preparing said pulverulent zinc component (B) to contain zinc in an amount sufficient to supply above about 50 grams per liter of pulverulent zinc to said coating composition; and
3. blending components together to prepare said coating composition of enhanced stability at a pH of below about 5.6 and above about 4.5.

5. The method of preparing a corrosion resistant coated metal substrate having an adherent coating from a pulverulent-zinc-containing coating composition exhibiting enhanced compositional stability at a pH below about 5.6 and above about 4.5, which composition is adapted for treating metal substrates and providing corrosion resistance thereto, and is prepared to contain hexavalent chromium from a pulverulent-zinc-free chromic acid component (A), and to further contain zinc from a pulverulent zinc component (B), which method comprises:

I. formulating the coating composition of enhanced stability by:
   1. preparing said chromic acid component (A) at a pH of from 3 to below about 5 and with reduced forms of chromium, if such exist, being substantially below 5 percent of the component hexavalent chromium, by:
      a. establishing an aqueous composition containing chromic acid in solution, said chromic acid being present in amount sufficient to provide for a pH in water of below 3.0;
      b. adjusting the pH of said aqueous composition to from 3 to about 5, inclusive, with basic, compatible and acid soluble pH adjustment agent, wherein compatibility of said pH adjustment agent provides cured coatings from said coating composition of enhanced water insolubility; and,
      c. admixing xanthan gum hydrophilic colloid to the composition of adjusted pH and after said pH adjustment, for preparing the chromic acid component (A);
   2. preparing said pulverulent zinc component (B) to contain zinc in an amount sufficient to supply above

about 50 grams per liter of pulverulent zinc to said coating composition; and

3. blending components together to prepare said coating composition of enhanced stability at a pH of below about 5.6 and above about 4.5; and thereinafter

II. applying the resulting coating composition to a metal substrate; and

III. permitting evaporation of volatile coating substituents thereby obtaining an adherent and corrosion resistant coating on said metal substrate.

3,970,483

NORMALIZED ALLOY STEEL FOR USE AT ELEVATED TEMPERATURE

Gerald J. Spaeder, Monroeville, Pa., assignor to United States Steel Corporation, Pittsburgh, Pa.

Filed July 23, 1975, Ser. No. 598,299
Int. Cl.² C22C 38/22, 38/24, 38/26
U.S. Cl. 148—36 2 Claims

1. A silicon-killed alloy steel suitable for high temperature applications up to about 1000°F consisting of:

0.15 to 0.21% carbon
0.70 to 1.0% manganese
0.15 to 0.30% silicon
0.40 to 0.65% chromium
0.45 to 0.60% molybdenum
0.05 to 0.10% vanadium
0.01 to 0.10% columbium and a balance essentially of iron and normal residual impurities, said steel normalized at a temperature of from 1550° to 1800°F and having a two-phase microstructure of ferrite and bainite.

3,970,484

SINTERING METHODS FOR COBALT-RARE EARTH ALLOYS

Manfred Doser, Edmore, and Frederick G. Jones, Alma, both of Mich., assignors to Hitachi Magnetics Corporation, Edmore, Mich.

Filed Jan. 20, 1975, Ser. No. 542,190
Int. Cl.² H01F 1/02
U.S. Cl. 148—103 11 Claims

1. A process for producing a high-density cobalt-rare earth intermetallic product having a high magnetic moment and having substantially stable permanent magnet properties which comprises providing an alloy of cobalt and rare earth metal in particulate form, said cobalt and rare earth metal being used in proportions substantially corresponding to those desired in a final sintered product, pressing said particulate alloy into a green body, sintering said green body in an atmosphere containing at least one percent hydrogen by volume to produce a closed-pore structure, and cooling said green body in an atmosphere which is changed from hydrogen-containing to inert at a temperature above about 300°C.

3,970,485

BINDER AND LUBRICANT REMOVAL FROM COBALT-RARE EARTH ALLOYS

Manfred Doser, Edmore, Mich., assignor to Hitachi Magnetics Corporation, Edmore, Mich.

Filed Jan. 20, 1975, Ser. No. 542,189
Int. Cl.² H01F 1/02
U.S. Cl. 148—103 8 Claims

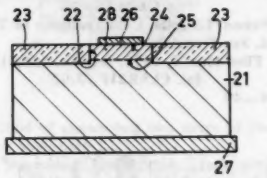
1. A process for producing a cobalt-rare earth intermetallic product having substantially stable permanent magnet properties which comprises providing an alloy of cobalt and rare earth metal in particulate form, said cobalt and rare earth metal being used in proportions substantially corresponding to those desired in a final sintered product, mixing an organic binder material with said particulate alloy, pressing said particulate alloy into a green body, subjecting said green body to a bake cycle in an atmosphere containing 1 to 100% by volume hydrogen at an intermediate temperature of between 100° and 500°C for about a half-hour whereby the hydrogen reacts with the molecules forming the organic binder and the resulting molecules volatilize from the green body, and thereafter sintering said body.

3,970,486

METHODS OF PRODUCING A SEMICONDUCTOR DEVICE AND A SEMICONDUCTOR DEVICE PRODUCED BY SAID METHOD

Else Kooi, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 672,622, Oct. 3, 1967, abandoned.
This application Feb. 14, 1975, Ser. No. 549,936
Claims priority, application Netherlands, Oct. 5, 1966, 6614016
Int. Cl.² H01L 21/22
U.S. Cl. 148—187 38 Claims



1. A method for the fabrication of a semiconductor device comprising the steps of:

a. forming on one surface of a substrate comprising monocrystalline silicon a masking layer comprising masking material other than silicon oxide which is effective to prevent oxidation of the underlying silicon during a thermal oxidation treatment;

b. removing a selected portion of said masking layer, thereby selectively exposing a portion of the surface of said substrate;

c. selectively removing a thin layer of silicon adjacent said exposed surface by thermally oxidizing silicon adjacent said exposed surface and then removing at least part of the thickness of the oxide layer thus formed without removing the remainder of said masking layer, thereby leaving a portion of said substrate beneath the masking layer in the form of a mesa;

d. selectively oxidizing the surface of said substrate remaining after removal of said thin layer to form a second oxide layer having an upper surface substantially coplanar with the top of said mesa;

e. removing the remainder of said masking layer thereby leaving the surface of said mesa exposed, said mesa being surrounded by the coplanar second oxide layer produced by the latter oxidizing step.

3,970,487

METHOD OF MANUFACTURING A POWER TRANSISTOR

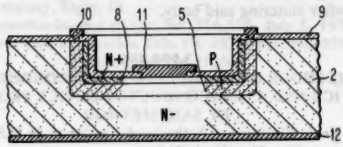
Manfred Dahmen, Gaeufelden-Oeschelbronn; Anneliese Ritzhaupt, Boeblingen, and Manfred Zurhelde, Gaeufelden-Oeschelbronn, all of Germany, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed June 16, 1975, Ser. No. 589,276
Claims priority, application Germany, Sept. 24, 1974, 2445480
Int. Cl.² H01L 21/302
U.S. Cl. 148—187 8 Claims

1. The method of manufacturing a planar power transistor having a highly doped emitter zone, a base zone with a flat doping profile, and a collector zone in a first conductivity type substrate, wherein the improvement comprises:

forming said base zone by introducing a second opposite conductivity type impurity into said substrate,

etching said base zone down to a shell-shaped remainder, forming said highly doped emitter zone by introducing first



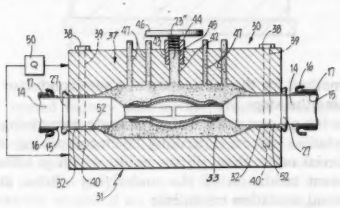
conductivity type impurity into said base zone remainder and forming contacts to the individual zones of said transistor.

3,970,488

METHOD AND APPARATUS FOR MOLDING SPLICES IN CABLES

Arthur L. Nelson, La Jolla, Calif., assignor to Townsend and Townsend, San Francisco, Calif.

Filed Mar. 7, 1975, Ser. No. 556,519
Int. Cl.² B21F *15/02*
U.S. Cl. 156—49 **13 Claims**



1. A method for forming a cable splice between two cable ends of a pair of cables having a radius *r*, said cables including an electrically conductive central core and a surrounding layer of electrically insulative material having a radial thickness W, said method comprising the steps of:

a. removing portion of said electrically insulative material from each of said cable ends to expose said electrically conductive central core:

b. joining the ends of said central cores to form a joint;

c. surrounding said joint and a portion of said insulative material with an insulative molding compound;

d. placing the surrounded joint in a mold having a central cavity and a pair of opposing end clamp portions, each end clamp portion having an inner surface with a radius

$$R = \sqrt{\frac{2rX}{\pi} + r^2}$$

where X is a numerical quantity lying in the range from about 0.20 to about 1.00; and

e. applying heat to said mold to soften said insulative molding compound so that a molded splice is formed about said joint.

10. In a mold for use in forming a cable splice between two cable ends of a pair of cables of a type associated with said mold, each said cable having a predetermined radius *r*, said cables including an electrically conductive core and a surrounding layer of electrically insulative material having a radial thickness W, said mold comprising first and second mating portions having opposing wall surfaces forming an enlarged central cavity and a pair of opposing end clamp regions each with an inner surface of radius R when said mating portions are mated, means for supplying an insulative molding compound to said central cavity, and means for heating said mold, the improvement wherein the radius R of the inner surface of each of said end clamp regions is dimensioned in accordance with the relationship

$$R = \sqrt{\frac{2rX}{\pi} + r^2}$$

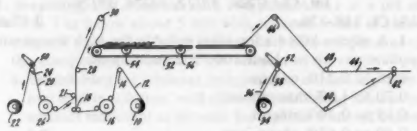
where X is a numerical quantity lying in the range from about 0.20 to about 1.00.

3,970,489

CORRUGATOR CONTROL SYSTEM

Robert W. Schmidt, Oak Lawn; John R. Gallet, Hickory Hills, and Thomas L. Czyz, Palos Hills, all of Ill., assignors to Copar Corporation, Oak Lawn, Ill.

Continuation-in-part of Ser. No. 445,579, Feb. 25, 1974, abandoned. This application July 14, 1975, Ser. No. 595,769
Int. Cl.² B65H *25/00*
U.S. Cl. 156—64 **19 Claims**



1. A system for controlling the amount of single face material in a storage area ahead of the double face operation including:

means for providing a signal representative of the difference between single face drive speed and double face drive speed,

means for sensing the amount of single face material moving into said storage area, means for sensing the amount of single face material leaving said storage area, comparison means connected to said sensing means for providing an output signal proportional to their difference,

means for sensing the speed of material moving adjacent the storage area input and means for sensing the speed of material moving adjacent the storage area output, means for comparing said storage area input and output material speeds, and means for applying the comparison from said storage area input and output speeds to said material comparison means,

speed control means for automatically increasing or decreasing the speed of said single face drive to maintain a predetermined level of single face material in said storage area, said signal representative of the speed difference and said material comparison proportional output signal being connected to said speed control means and providing the input signals therefor.

16. A method of controlling the amount of single face material in a storage area ahead of the double face operation including the steps of:

sensing the difference between single face drive speed and double face drive speed and providing a signal proportional to that difference,

sensing the amount of single face material moving into the storage area and sensing the amount of single face material leaving the storage area and providing a signal proportional to their difference,

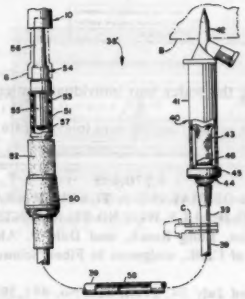
measuring the speed of single face material adjacent the input to the storage area and measuring the speed of single face material adjacent the output of the storage area, comparing said speeds and applying the resultant comparison to the signal proportional to the difference between material entering and leaving the storage area,

and using the signal proportional to the difference in single face and double face drive speeds and the material proportional signal to automatically increase or decrease the speed of the single face drive to maintain a predetermined level of single face material in the storage area.

3,970,490
INTRAVENOUS INJECTION APPARATUS AND NEEDLE ADAPTER WITH FILTER AND METHOD OF MAKING SAME

Kenneth Raines, and George K. Burke, both of Bethlehem, Pa., assignors to Burron Medical Products, Inc., Bethlehem, Pa.

Division of Ser. No. 423,682, Dec. 11, 1973, which is a continuation-in-part of Ser. No. 299,268, Oct. 20, 1972, abandoned. This application May 20, 1975, Ser. No. 579,198
Int. Cl.² B32B *31/18, 31/20*
U.S. Cl. 156—73.1 3 Claims



1. A method of making a needle adapter and filter therefor from flat filter material to increase the filter area comprising the steps of:

providing a hollow tubular filter housing having a bore therethrough and a marginal edge at one end thereof surrounding said bore;

positioning the other end of said housing on a support;

orienting a web of flat filter material over said filter housing one end;

cutting a section of flat filter material from said flat web;

engaging a sealing element with said filter material and producing a dome-shaped filter of increased filtering area by pressing said flat filter material onto said housing marginal edge rapidly enough to cause air located between said filter material and said bore to become trapped therebetween and to deform that filter material located adjacent said bore into a dome-shaped configuration, and simultaneously sealing said deformed filter material to said housing marginal edge so that the filter material remains in said dome-shaped configuration to thereby increase the amount of filtering area associated with said filter housing, and completely sealing said deformed filter to said housing so that all of a solution passing through said bore passes through said dome-shaped filter material and leakage therearound is effectively prevented;

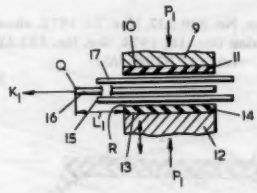
removing said tubular filter housing with said dome-shaped filter secured thereto from said support; and

securing said filter housing with said dome-shaped filter sealed thereon in the bore of a hollow needle adapter housing.

3,970,491
METHOD FOR MUTUALLY CONNECTING TWO STRIPS OF A THERMOPLASTIC MATERIAL

Salomon Pezarro, Pijnacker, Netherlands, assignor to N.V. Technische Maatschappij Marchand-Andriessen, Rijswijk, Netherlands

Filed Dec. 19, 1974, Ser. No. 535,046
Claims priority, application Netherlands, Dec. 21, 1973, 7317632
Int. Cl.² B32B *31/20*
U.S. Cl. 156—73.5 4 Claims



1. The method of connecting two strips of thermoplastic material which comprises

positioning the ends of said strips in overlapping relation,

interposing a third strip of similar thermoplastic material between the overlapping ends of said two strips,

applying a pressure force to the outer surfaces of said two strips in a direction transverse to the lengths thereof to force said strips toward one another with said third strip therebetween,

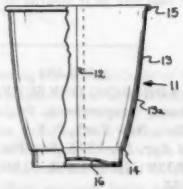
applying a tractive force longitudinally to said third strip at a point remote from the overlapping ends,

continuing said gripping force to maintain said ends of said two strips stationary and continuing said tractive force such that the third strip is moved rapidly in a direction longitudinally of said two strips creating heat until said third strip is completely removed from between said two strips and said two strips are fused to one another.

3,970,492
METHOD AND APPARATUS FOR FORMING THERMOPLASTIC CONTAINERS

Stephen W. Amberg, Toledo, Ohio, and Thomas E. Doherty, Setauket, N.Y., assignors to Owens-Illinois, Inc., Toledo, Ohio

Continuation-in-part of Ser. No. 354,305, April 25, 1973, abandoned, which is a continuation-in-part of Ser. No. 211,259, Dec. 23, 1971, Pat. No. 3,854,583. This application June 14, 1974, Ser. No. 479,421
Int. Cl.² B29C *27/28*
U.S. Cl. 156—85 12 Claims



1. The method of fabricating a sidewall of a nestable cup-like container comprising, the steps of: providing a rectangular blank of an expanded, heat-shrinkable thermoplastic material; forming said blank into a tubular sleeve having facing ends; joining the ends of the sleeve to one another in a liquid-tight seam extending completely of said ends; providing a mandrel having a generally frusto-conically shaped outer

surface which conforms with the configuration of the inner surface of the sidewall of a nestable cup-like body; placing the sleeve around the mandrel; exposing the sleeve to heat while it is in position around the mandrel to cause the sleeve to shrink so as to conform to the outer surface of the mandrel while maintaining the liquid-tight character of the seam; and removing the shrunken sleeve from the mandrel by moving the sleeve axially relative to the mandrel.

3,970,493

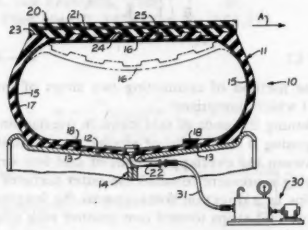
BELT REPLACEMENT METHOD FOR TUBE TIRES

Charles E. Grawey, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Continuation of Ser. No. 309,237, Nov. 24, 1972, abandoned. This application Dec. 16, 1974, Ser. No. 533,420

Int. Cl.² B29H *5/04*

U.S. Cl. 156—96 **3 Claims**



1. A method of placing replaceable tread and track belt having inextensible circumferential reinforcing members with a diametrical interference fit on a rim suspended pneumatic radially reinforced oval tube-tire carcass having a substantially flat belt mounting crown connected between the tops of its side walls wherein the crown and belt include interlocking circular ribs and grooves comprising the steps of:

a. positioning said rim suspended oval tube-tire carcass above the ground, and without removing said tube-tire carcass from said rim;

b. evacuating said tube-tire carcass until a partial inward collapse of its flat crown has occurred sufficient to convert said tube-tire carcass into a polygonal carcass configuration with more than three lobes and having portions of said flat crown inwardly curved with respect to chord lines joining apexes of adjacent lobes;

c. draping a belt on said apexes of said lobes and aligning said belt with said interlocking circular ribs and grooves of said belt and said crown of said tube-tire carcass in registry at said lobes; and

d. releasing said vacuum to allow said tube-tire carcass to expand into said belt as it returns to a circular configuration.

3,970,494

METHOD FOR ADHERING ONE SURFACE TO ANOTHER

Edwin J. Pritchard, Coopersburg, Pa., assignor to Western Electric Co., Inc., New York, N.Y.

Filed Apr. 18, 1975, Ser. No. 569,529

Int. Cl.² B32B *31/00*; C08L *91/06*; C09D *3/387*

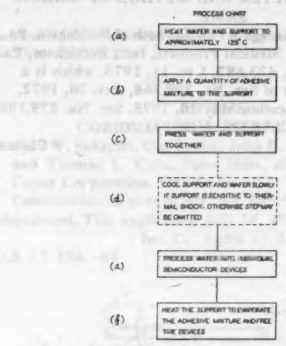
U.S. Cl. 156—155 **11 Claims**

7. A method for handling a semiconductor wafer, which comprises the steps of:

a. heating the wafer and support therefor;

b. applying a mixture of chloronaphthalene and 8–15% p-terphenyl to the support, said chloronaphthalene comprising the tetra, penta, and hexa isomers of chloronaphthalene;

c. pressing the wafer and support together to temporarily mount the wafer on the support;


PROCESS CHART
(a)
HEAT WAFER AND SUPPORT TO APPROXIMATELY 125° C
(b)
APPLY A QUANTITY OF ADHESIVE MIXTURE TO THE SUPPORT
(c)
PRESS WAFER AND SUPPORT TOGETHER
(d)
COOL SUPPORT AND WAFER SLOWLY IF SUPPORT IS SENSITIVE TO THERMAL SHOCK- OTHERWISE STEP MAY BE OMITTED
(e)
PROCESS WAFER INTO INDIVIDUAL SEMICONDUCTOR DEVICES
(f)
HEAT THE SUPPORT TO EVAPORATE THE ADHESIVE MIXTURE AND FREE THE DEVICES

d. processing the wafer into individual semiconductor devices; and

e. heating the support and devices to evaporate the mixture.

3,970,495

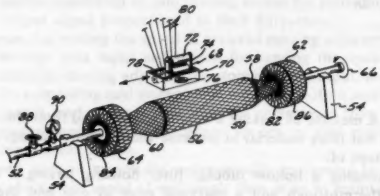
METHOD OF MAKING A TUBULAR SHAFT OF HELICALLY WOUND FILAMENTS

Larry J. Ashton, Long Beach, and Dale P. Abildskov, San Pedro, both of Calif., assignors to Fiber Science, Inc., Gardena, Calif.

Filed July 24, 1974, Ser. No. 491,302

Int. Cl.² B32B *31/18*; B65H *81/00*; B29C *17/04*; F16L *9/16*

U.S. Cl. 156—162 **12 Claims**



1. The method for the fabrication of a tubular shaft having a cylindrical center section and opposite radial end flanges secured thereto by frusto-conical fillet sections which comprises:

forming a sheathing of continuous filament wrapping about a mandrel having a cylindrical center section and tapered end sections with removable flange portions by winding filaments of fibrous reinforcing material in a helical path about said mandrel and guiding said filaments in mandrel end-to-end traversing paths to form said sheathing about the mandrel cylindrical center section in a plurality of layers of helically wound filaments thereon at a first helix angle and guiding said windings radially inwardly about the mandrel tapered end sections to form said frusto-conical fillet sections of said sheathing at a greater helix angle and radially outwardly in a chordal path about said flange portions, thereafter reversing the path of said filaments about said flange portions so that said filaments are applied in layers comprising two adjacent thicknesses of filaments in parallel alignment in each thickness and in diagonal orientation between thicknesses;

embedding said layers of wound filaments in a bonding resin;

curing said bonding resin to cement said sheathing into a rigid shaft member;

cutting said cured sheathing about said flange portions of said mandrel; and

removing said flange portions to form a tubular shaft having a cylindrical center section and opposite end flanges secured thereto by said frusto-conical fillet sections.

3,970,496

MANUFACTURE OF LAMINATES OF SHEET METAL, POLYTHENE AND ALUMINUM FOIL

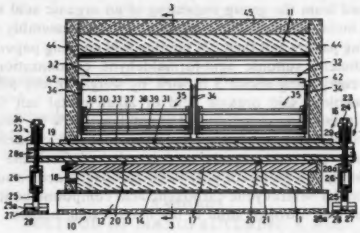
John Ian Menzies, Brisbane, Australia, assignor to Heatshield Research and Development Pty. Ltd., Oxley, Australia

Filed Oct. 10, 1974, Ser. No. 513,722

Claims priority, application Australia, Oct. 10, 1973, 5167/73

Int. Cl.² B31C *13/00*

U.S. Cl. 156—162 **9 Claims**



1. A method for increasing the bond strength of a bonded laminate of two metallic layers joined by a thermal plastic adhesive, comprising the steps of

continuously interleaving a web of thermal plastic adhesive between two metal sheets;

heating at least one of said metal sheets sufficiently to melt said thermal plastic adhesive;

applying pressure to said heated laminate so as to cause said metal sheets to adhere;

subsequently coiling said laminate on a mandrel under tension of not less than one thousand pounds per square inch of laminate cross-section;

removing said coiled laminate from said mandrel and clamping said coiled laminate radially to prevent relative movement of the coil convolutions;

applying sufficient heat to the interior of said coil to maintain the coolest convolution of said coil at a predetermined temperature for a predetermined period, thereby effecting curing of said laminate; and

at the end of said predetermined period terminating the application of said heat to the interior of said coil and permitting said coil to cool progressively to ambient temperature from the outer coil layers inwards, whereby bonding strength between said metallic layers is optimized.

3,970,497

END TRIM PLYWOOD PROCESS

Clinton G. Glover, Clarkston, Wash.; Jack H. Markley, and Patrick J. Young, both of Lewiston, Idaho, assignors to Potlatch Corporation, San Francisco, Calif.

Division of Ser. No. 351,544, April 16, 1973. This application Dec. 30, 1974, Ser. No. 537,342

Int. Cl.² B27D *1/04;* **B32B** *31/18, 31/20*

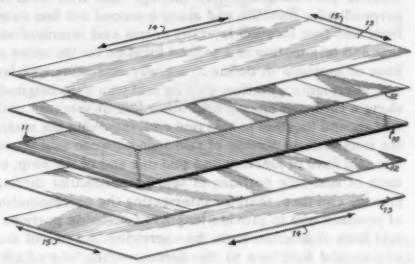
U.S. Cl. 156—182 **7 Claims**

1. A process for producing a laminated plywood panel, comprising the following steps in sequence:

a. trimming sides and ends of conventional plywood panels to form standard size rectangular plywood sheets and salvaging end trim strips therefrom that are of a predetermined minimum width and have face veneers with wood grain thereof running perpendicular to the length of the end trim strip;

b. sawing each salvaged end trim strip along a line parallel to its trimmed edge to produce a rectangular strip;

c. assembling a solid central core from a plurality of the rectangular end trim strips of common thickness by arranging the strips in a coplanar panel configuration with the strips parallel to one another and to one edge of the



core, with side edges of adjacent strips being in abutment with one another and the face veneer surfaces of the plywood strips presenting oppositely facing planar core surfaces;

d. placing a first layer of wood veneer over the face veneer surfaces of the plywood strips at each side of the core with a layer of adhesive between the first layers of wood veneer and the core;

e. and curing the layers of adhesive by application of heat thereto while under surface pressure perpendicular to the layers of adhesive.

3,970,498

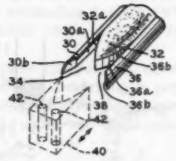
METHOD OF MAKING TRIM STRIP END FINISHES

Theodore Loew, Schenectady, N.Y., assignor to The Standard Products Company, Cleveland, Ohio

Continuation of Ser. No. 213,435, Dec. 29, 1971, abandoned. This application July 21, 1975, Ser. No. 597,565

Int. Cl.² B31F *3/00;* **B60R** *19/00;* **C09J** *5/00*

U.S. Cl. 156—211 **8 Claims**



1. A method of forming an end finish on at least one of the opposite ends of an elongated, thin and laterally narrow plastic trim strip mountable on an underlying support surface, said trim strip in transverse cross-section being thinner than it is wide and including laterally spaced apart side portions and an intermediate portion therebetween and integral therewith, said side and intermediate portions being longitudinally continuous between said opposite ends and having a common bottom surface and corresponding outer surfaces spaced above said botton surface, the outer surfaces of said side portions being of identical contour and dimension transversely of said strip and having laterally spaced apart inner and outer edges, the inner edges of said outer surfaces of said side portions being laterally spaced apart and intersecting the outer

surface of said intermediate portion at an angle to provide laterally spaced apart visible lines of junction between said side portions and said intermediate portion, said lines of juncture extending parallel to one another between said opposite ends of said trim strip, the method comprising the steps of: cutting said trim strip longitudinally along a first cut line on at least one of said lines of juncture and from said one end of said trim strip to a first location on said one line of juncture between said opposite ends and spaced from said one end, said first cut line being completely through said strip in the direction perpendicular to said bottom surface, cutting said intermediate portion completely through said trim strip in said perpendicular directon and along a second cut line extending from said first location laterally across said intermediate portion and terminating at a second location on the other of said lines of juncture to define a laterally extending end face for said intermediate portion, cutting said trim strip longitudinally along a third cut line on said other line of juncture and from said second location to said one end, removing the material of the intermediate portion of said strip between said second cut line said lines of juncture and said one end of the strip, cutting each of said side portions in said perpendicular direction to provide end faces therefor intersecting the corresponding line of juncture and to provide lengths of said side portions along said lines of juncture from the corresponding one of said first and second locations to the corresponding one of said side portion end faces, said lengths of said side portions together being equal to the length of said laterally extending end face of said intermediate portion between said first and second locations, displacing at least one of said lengths of said side portions laterally inwardly of said strip into juxtaposed and covering relationship with a corresponding length of said end face of said intermediate portion and to bring said end faces of said side portions into juxtáposed facial relationship, and bonding said displaced length of said side portions and said intermediate portion to maintain said juxtaposed relationships, whereby said side portions together define a continuous border longitudinally of said intermediate portion and laterally about said end face thereof.

3,970,499

METHOD FOR THE APPLICATION OF GLUED LABELS TO BOTTLES OR THE LIKE

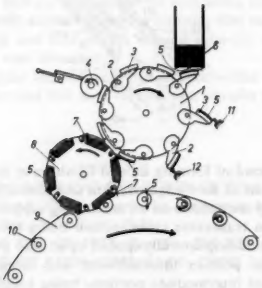
Willi Bommes, Dusseldorf, Germany, assignor to Jagenberg Werke AG, Dusseldorf, Germany

Filed May 15, 1974, Ser. No. 469,716

Claims priority, application Germany, May 15, 1973, 2324412

Int. Cl.² B65B *45/00*; B65C *9/08*

U.S. Cl. 156—227 **2 Claims**



1. In the method of applying glued thin foil-like labels to continuously advancing bottles or the like, wherein a pickup member is successively brought into contact with a glue applying means, the topmost label of a stack thin foil-like labels and a gripper carried by a cylinder for receiving a glued label and placing it on the bottle, the improvement which comprises folding over by 180° that marginal area of each label which is later to be gripped by the gripper, folding being effected while the label is carried by the pickup member.

3,970,500

PROCESS FOR SEPARATING A NUMBER OF SHEETS INTO GROUPS

Akio Ishizuka, and Yasuhiro Ogata, both of Fujimiya, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Dec. 11, 1974, Ser. No. 531,501

Claims priority, application Japan, Feb. 19, 1974, 49-19761

Int. Cl.² B41L *1/24*

U.S. Cl. 156—305 **18 Claims**

1. A process for separating a number of pressure sensitive copying papers into groups which comprises (1) coating an adhesive composition comprising a naphthalene sulfonic acid-formaldehyde condensation product and at least one member selected from the group consisting of an organic acid and an alkali metal salt thereof, on an edge of a stack assembly of said copying papers and then (2) fanning said copying papers; said naphthalene sulfonic acid-formaldehyde condensation produce comprising about 5 to 40% by weight of the adhesive composition, said organic acid or alkali metal salt thereof being present in an amount of about 1 to 100% by weight of said naphthalene sulfonic acid-formaldehyde condensation product, and said organic acid is selected from the group consisting of a mono- or poly-basic carboxylic acid, a sulfonic acid, and a heterocyclic carboxylic acid compound containing at least one nitrogen atom in the heterocyclic nucleus.

3,970,501

PROCESS FOR SEPARATING A NUMBER OF SHEETS INTO GROUPS

Akio Miyamoto, and Keiso Saeki, both of Fujimiya, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Dec. 11, 1974, Ser. No. 531,503

Claims priority, application Japan, Dec. 11, 1973, 48-139419

Int. Cl.² B41L *1/24*

U.S. Cl. 156—305 **11 Claims**

1. A process for separating a number of pressure sensitive copying papers into groups which comprises (1) coating an adhesive composition comprising a naphthalene sulfonic acid-formaldehyde condensation product and a water-soluble polymer on an edge of a stack assembly of said copying papers and then (2) fanning said copying papers; said naphthalene sulfonic acid-formaldehyde condensation product comprising about 5 to 40% by weight of the adhesive composition and said water-soluble polymer, which is selected from the group consisting of natural polymer, a semi-synthetic polymer and a synthetic polymer, comprising about 0.1 to 20% by weight of the adhesive composition.

3,970,502

BUILDING PANEL AND PROCESS FOR MANUFACTURING SAME

Hamish Turner, 576 Otis Blvd., Spartanburg, S.C. 29302

Division of Ser. No. 214,538, Jan. 3, 1972, Pat. No. 3,785,103. This application Dec. 10, 1973, Ser. No. 423,266

Int. Cl.² B32B *7/00*

U.S. Cl. 156—310 **8 Claims**

1. A process for producing a building panel comprising the steps of:

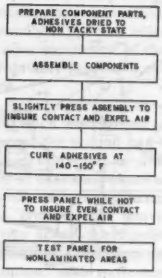
a. preparing outer skins and edge members and applying a solvent based adhesive to selected portions thereof;

b. preparing a foam core and applying a water dispersed adhesive thereto;

c. drying said adhesives to a substantially non tacky state;

d. assembling the outer skins, edge members and foam core to provide a panel;

e. applying pressure to said assembled panel, said pressure being sufficient to expel air therefrom;


PREPARE COMPONENT PARTS, ADHESIVES DRIED TO NON TACKY STATE
ASSEMBLE COMPONENTS
SLIGHTLY PRESS ASSEMBLY TO INSURE CONTACT AND EXPEL AIR
CURE ADHESIVES AT 140–150° F
PRESS PANEL WHILE HOT TO INSURE EVEN CONTACT AND EXPEL AIR
TEST PANEL FOR NONLAMINATED AREAS

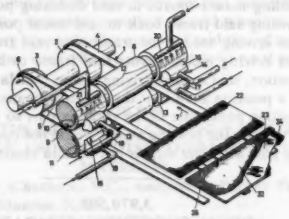
f. heating said panel to occure the adhesive compositions; and

g. applying further pressure said panel while said panel is hot to insure complete bonding and expel further air therefrom.

3,970,503
METHOD OF MANUFACTURING A BAG

Takehisa Yoshimura, Suita, Japan, assignor to Ruby Net Hosoki Kabushiki Kaisha, Osaka, Japan

Filed Dec. 27, 1974, Ser. No. 536,915
Int. Cl.² C09J 5/10
U.S. Cl. 156—323 **6 Claims**



1. A method of manufacturing a plurality of bags from a single cylindrical net-like bag blank consisting of synthetic fibers or synthetic resin comprising the steps of:

inserting into said bag blank a plurality of resilient plates each having a length at least equal to the depth of the bags to be manufactured and a width substantially equal to the circumferential length of said bag blank in such a way that the plates are not overlapped with the related bag bottom forming portions of said bag blank, but are overlapped with the related bag mouth forming portions of said bag blank;

applying a molten polyethylene resin in the form of at least one filament or strip extending widthwise of the bags to be manufactured to the opposite outer surfaces of said bag blank in said bag mouth forming portions and to at least one outer surface of said bag blank in said bag bottom forming portions; and

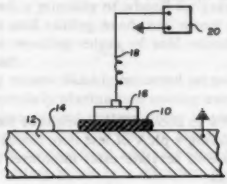
immediately after applying said resin, cooling under pressure said applied molten polyethylene resin to embed the synthetic fibers or synthetic resin of said bag blank into said applied polyethylene resin and to solidify the latter; and

severing the thus processed bag blank into individual bags.

3,970,504
ULTRASONIC COUPLING METHOD

David Nelson Palmer, Tolland, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed Oct. 25, 1974, Ser. No. 517,972
Int. Cl.² C09J 3/14
U.S. Cl. 156—329 **5 Claims**



1. A method of adhering and ultrasonicly and electrically coupling an ultrasonic transducer to a surface wherein said coupling will be subject to high temperature and radiation comprising the steps of applying a layer of electrically conductive room temperature vulcanizing material between said transducer and said surface and curing said room temperature vulcanizing material to cause said transducer to be adhered and coupled to said surface, said room temperature vulcanizing material comprising:

a. a matrix selected from the group consisting of vinylmethyl siloxane and polyphenyl siloxane;

b. an iron oxide binder-filler;

c. a catalyst capable of causing cross-linking of said matrix; and

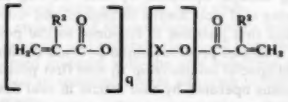
d. a finely divided homogenously dispersed conductive material selected from the group consisting of palladium and graphite.

3,970,505
ANAEROBIC COMPOSITIONS AND SURFACE ACTIVATOR THEREFOR

Martin Hauser, West Hartford, and Bernard M. Malofsky, Bloomfield, both of Conn., assignors to Loctite Corporation, Newington, Conn.

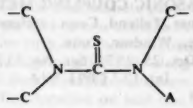
Continuation-in-part of Ser. No. 323,689, Jan. 15, 1973, abandoned. This application Aug. 20, 1974, Ser. No. 498,904
Int. Cl.² C08F 18/24, 218/00, 216/02, 220/00
U.S. Cl. 156—331 **11 Claims**

1. A polymerizable composition, curable through gaps of twenty mils or more, comprising a polymerizable acrylate ester monomer selected from the group consisting of monofunctional acrylate esters and polyacrylate esters having the formula



wherein R^2 is a radical selected from the group consisting of hydrogen, halogen and alkyl of from 1 to about 4 carbon atoms; q is an integer equal to at least 1; and X is an organic radical containing at least two carbon atoms and having a total bonding capacity of q plus 1; at least 0.1% of a hydroperoxide polymerization initiator capable of polymerizing said monomer in the substantial absence of oxygen, a cure-through-gap agent consisting of a combination of;

a. a substituted thiourea of the formula



wherein A is hydrogen or

and

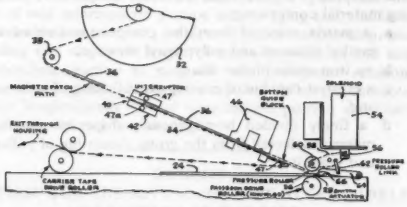
b. about 0.1% to about 5% by weight of the composition of an acid having a pKA of less than about 6 and soluble in the mixture of acrylate ester monomer and hydroperoxide initiator.

3,970,506

MAGNETIC PATCH ARRANGEMENT APPARATUS

Okum Kwan, Trumbull, and William A. Ottersen, Norwalk, both of Conn., assignors to Bunker Ramo Corporation, Oak Brook, Ill.

Filed July 23, 1974, Ser. No. 491,022
Int. Cl.² B32B 31/04
U.S. Cl. 156—351 **12 Claims**



1. Applicator apparatus for applying one label of a plurality of labels each carried in a successive position on a tape to a flat article moving in one direction, the improvement comprising:

Mechanical stop means operable for engaging said article to stop said article in a first position when said article is moved in said one direction toward said stop means;

drive means operable for thereafter moving said article in said one direction and for simultaneously moving said tape carrying said labels at substantially the same velocity;

sensing means operated responsive to said one label being moved to a second position having a predetermined spacial relationship to said first position to disable said drive means and stop said one label in said second position;

positioning means, operated by said sensing means, for positioning said stop means to engage and stop said article at said first position in response to the position of a label at a second predetermined position having a predetermined spacial relationship to said first position;

control means operated by said article in said first position for retracting said stop means from engagement with said article and for operating said drive means to simultaneously move said tape and said article at substantially the same velocity, said article moved by said drive means in said one direction from said first position past said stop means and said one label moved by said drive means from said second position toward said article and

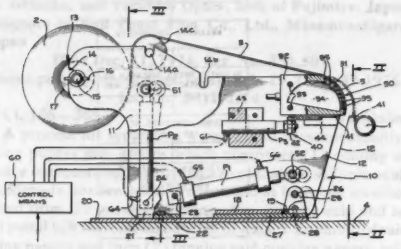
means for separating said moving one label from said tape to apply said one label to said moving article while said tape and article are moved at said same velocity.

3,970,507

TAPE DISPENSER AND METHOD OF DISPENSING TAPE

Chester G. Dalzell, and Burton D. Pace, both of Ogallala, Nebr., assignors to TRW Inc., Ogallala, Nebr.

Filed Oct. 17, 1974, Ser. No. 515,707
Int. Cl.² B65C 3/12
U.S. Cl. 156—446 **9 Claims**



1. In a tape dispenser for dispensing tape to be wound around a rotating part including supporting means for supporting the rotation of a reel of tape and holding means for holding a portion of the tape at a position remote from the reel and cutting means to sever the tape after a predetermined length has been wound around the rotating part, said holding means and cutting means being mounted on a frame, displacement means to move the holding means from an initial position to a dispensing position in close proximity to the rotating part so that the adhesive on the tape at said remote position contacts said rotating part, and the tape is gripped thereby so that the rotation of the rotating part causess tape to be wound around the part, the improvement comprising the provision of:

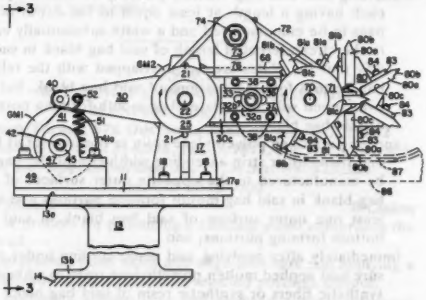
said displacement means including first driving means primarily for pivoting said frame about a pivot so that the holding means moves to said disensing position and for pivoting said frame back to said initial position, and second driving means for translating said frame after said first driving means pivots said frame to said dispensing position, said second driving means translating said frame to a position such that the holding means is in a cutting position proximate to the rotating part so that a free end of tape on the holding means would not contact the rotating part after the tape is cut by said cutting means.

3,970,508

DECAL SMOOTHING APPARATUS

Mijo A. Gossie, Corning, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed Feb. 26, 1975, Ser. No. 553,176
Int. Cl.² B65C 9/36
U.S. Cl. 156—477 R **4 Claims**



1. In an apparatus for automatically applying transfer films of decals to upwardly facing surfaces of pieces of dish-like

pottery ware, glass or glass-ceramic ware, or the like, as each piece of ware is intermittently conveyed through a path of travel comprising a plurality of dwell stations including a film smoothing station, an assembly for smoothing and removing any air or solvent which is entrapped between said transfer films and said surfaces of said pieces of ware during the applying of said films, such assembly being disposed at said smoothing station and comprising, in combination,

A. a lever arm pivotally supported adjacent its center for vertical reciprocative movement of the ends thereof,

B. a cam follower rotatably supported on said arm adjacent a first end thereof,

C. a stellate wheel including a plurality of radial fingers of a resilient material, such wheel being rotatably supported by said arm adjacent the second end thereof and above each piece of ware conveyed to and dwelling at said smoothing station so that said wheel can be periodically actuated downwardly and rotated to cause the tips of said radial fingers to contact and move with a wiping squeegee-like action across the transfer film on said upwardly facing surface of each piece of ware dwelling at the smoothing station, such movement of such fingers being in a direction extending generally radially from adjacent the center of each respective piece of ware towards the outer rim thereof,

D. a rotary cam having a peripheral rim including thereon high and low regions at selected maximum and minimum distances from the pivotal center of the cam, such cam rotatably mounted on said assembly below said cam follower,

E. spring means for forcing said first end of said lever arm in a direction to maintain the peripheral rim of said cam follower in contact with said peripheral rim of said cam,

F. means for imparting rotation to said cam for periodic actuation of said second end of said lever arm and, thereby, said stellate wheel to a downward position and the tips of said radial fingers thereof into contact with the transfer film on each respective piece of ware dwelling at the smoothing station and being rotated thereat, and

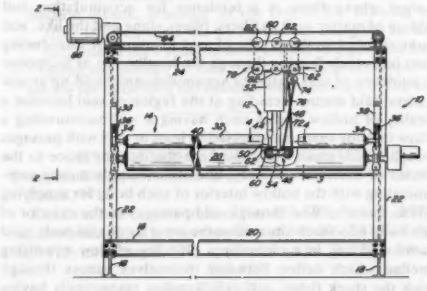
G. means for imparting rotation to said wheel to provide said wiping squeegee-like action of said tips of said radial fingers when such wheel is in its said downward position.

3,970,509

APPARATUS FOR SIMULTANEOUSLY CUTTING, SEALING AND STITCHING THERMOPLASTIC MATERIAL

Joseph Vitale, Charlotte, N.C., assignor to Perfect Fit Industries, Inc., Monroe, N.C.

Filed Nov. 18, 1974, Ser. No. 524,690
Int. Cl.[2] B29C *27/08*; B32B *31/16*
U.S. Cl. 156—580 **3 Claims**



1. A machine for simultaneously cutting, sealing and stitching thermoplastic material, comprising:

A frame assembly;

means mounted on said frame assembly for advancing the material through the machine and for positioning the section of material to be cut along a predetermined cutting plane;

a frame member mounted on said frame assembly transversely to the direction in which the said material is advanced-- was inserted; and in a plane parallel to the cutting plane;

a cutting assembly including a sonic horn having a flat cutting head, a plurality of wheels for pressing the material against said cutting head, and wheel support means biasing the working edges of said wheels against said cutting head;

reciprocating means slidably mounted on said frame member for alternately placing said cutting assembly in a first position wherein said cutting plane is situated between said cutting head and said wheels, and a second position wherein said cutting head and said wheels are disposed from said cutting plane in a direction perpendicular to said cutting plane; and

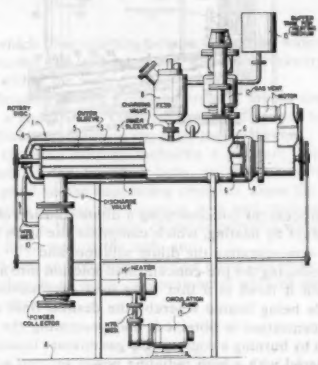
means for moving said reciprocating means and said cutting assembly along said frame member.

3,970,510

METHOD AND APPARATUS FOR CONVERTING A LIQUID MATERIAL INTO A POWDER

Muneaki Nakai, Osaka, Japan, assignor to Yashima Chemical Engineering Co., Ltd., Osaka, Japan

Filed Sept. 3, 1974, Ser. No. 502,318
Claims priority, application Japan, Sept. 3, 1973, 48-99397
Int. Cl.[2] B01D *1/22, 1/24*; B01F *7/02*
U.S. Cl. 159—6 WH **2 Claims**



1. A method of converting a solution or slurry into a powder comprising:

feeding said solution or slurry comprising a material dissolved or dispersed in a liquid into a horizontally elongated fixed drum closed at both ends,

heating and stirring the solution or slurry within said drum to evaporate and separate the liquid from the dissolved or dispersed material with the now solidified and dispersed material in semi-solid form adhering to the inner wall of the drum,

moving at least one scraper extending longitudinally within said drum parallel to said drum axis and adjacent said drum inner wall about a circular path defined by the drum axis to scrape accumulated solidified and dispersed material from said drum wall, and causing at least one loosely supported roller extending parallel to the scrapers and adjacent thereto to move along a similar proximate circular path and to periodically contact said scraper to transfer solidified and dispersed material from said scraper to

the roller periphery and to periodically contact the inner wall of drum to press said transferred solidified and dispersed material on said roller periphery against the inner wall of said drum to dry the same into powdered form, and

collecting the thus formed powder.

3,970,511

PROCESS AND INSTALLATION FOR CONCENTRATING DILUTE SOLUTIONS OF CORROSIVE PRODUCTS

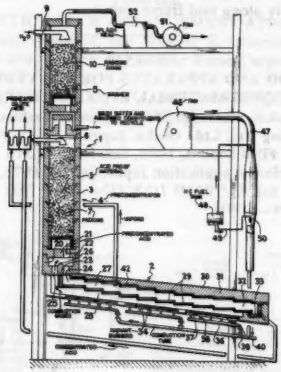
Roger M. Rat, Saint-Medard-en-Jalles; Francois A. Pollozec, Bergerac, and Jean J. Patouillet, Paris, all of France, assignors to Societe Nationale des Poudres et Expolsifs, Antar Petroles de l'Atlantique: Antargaz, France

Filed Dec. 18, 1973, Ser. No. 425,922

Claims priority, application France, Dec. 19, 1972, 72.45228

Int. Cl.² B01D *1/14, 1/22, 1/02;* **C01B** *17/90*

U.S. Cl. 159—13 C **19 Claims**



1. A process for concentrating a dilute solution of a corrosive product by heating, which comprises the steps of

1. pre-concentrating the dilute solution, and
2. introducing the pre-concentrated solution into a tunnel in which it flows in a thin layer over successive cascades while being heated whereby the desired final degree of concentration is obtained, and generating the required heat by burning a combustible gas mixture inside a burner material with a high radiating power located sufficiently close to said tunnel in which the solution flows to heat said solution and volatile materials are vaporized while being isolated from the combustion gases.

3,970,512

FALLING FILM EVAPORATOR

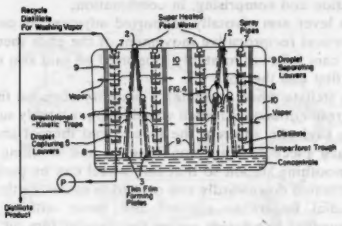
Ismail Zulfugarovich Makinsky, ulitsa Saratovtsa-Efima, 3/5, kv. 8, and Samuil Petrovich Baksht, ulitsa Nizami, 129, kv. 13, both of Baku, U.S.S.R.

Continuation of Ser. No. 170,151, Aug. 9, 1971, abandoned. This application Oct. 8, 1974, Ser. No. 513,172

Int. Cl.² B01D *1/22, 1/00*

U.S. Cl. 159—13 R **4 Claims**

1. An evaporator, substantially for a distiller, comprising in combination: a housing accomodating horizontal pipelines having nozzle openings on their undersides for feeding superheated water to be treated therethrough; an evaporating surface including a plurality of inclined plates disposed within said housing and defining an acute angle to the longitudinal vertical plane thereof, the superheated water being fed through the nozzle openings onto the upper edges of said plates through the nozzle openings of said pipeline for being subjected to film evaporation from the surfaces of said plates; and gravitational-kinetic traps comprising a plurality of horizontal, superposed parallel perforated troughs with perforate



undersides mounted in said housing in the path of the horizontal movement of the vapor produced due to later withdrawal of same from said film evaporation of the superheated water, said traps providing for catching the entrained liquid particles carried away by the vapor.

3,970,513

STEAM SUPPLYING STRUCTURE FOR OPPOSING BUILD-UP OF MATTER IN HEADBOXES

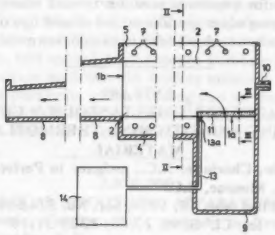
Antti Lehtinen, Jyvaskyla, Finland, assignor to Valmet Oy, Helsinki, Finland

Continuation-in-part of Ser. No. 529,113, Dec. 3, 1974, abandoned. This application Apr. 9, 1975, Ser. No. 566,328

Claims priority, application Finland, Apr. 10, 1974, 1101/71

Int. Cl.² D21F *1/02*

U.S. Cl. 162—272 **3 Claims**



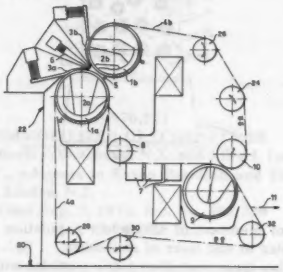
1. In a paper machine, a headbox having in its interior a location where there is a tendency for accumulation and build-up of matter such as fibers, fillers, slime and the like, and means situated in the region of said location for introducing steam into stock flowing through the headbox so as to oppose the tendency of said matter to accumulate and build-up at said location, said means including at the region of said location a plurality of hollow bodies each having a wall surrounding a hollow interior space and formed at least in part with passages through which steam can flow from the interior space to the exterior of each hollow body, and steam-supply means communicating with the hollow interior of each body for supplying thereto steam to flow through said passages to the exterior of each body into stock situated at the exterior of said body, said headbox having in its interior a plurality of flow-equalizing lamellae which define between themselves spaces through which the stock flows, and said lamellae respectively having leading edge regions toward which the stock flows and trailing edge regions away from which the stock flows, and said plurality of hollow bodies, respectively being connected with said lamellae and extending along one of said edge regions thereof

for introducing steam into the stock at the region of said one of said edge regions of said lamellae.

3,970,514
COMBINATION-PAPER MACHINE

Erik Albert Nykopp, Tampere, Finland, assignor to Oy Tampella AB, Tampere, Finland

Filed Feb. 4, 1975, Ser. No. 547,021
Claims priority, application Finland, Feb. 15, 1974, 447/74
Int. Cl.² D21F 1/00
U.S. Cl. 162—303 **4 Claims**



1. A combination-paper machine for the continuous manufacture of a fibrous web comprising:

a base;

a frame on the base;

a pair of perforated cylinders rotatably supported on the frame with parallel axes at such distance from each other that the width of a slit formed therebetween is slightly greater than the thickness of the finished web;

two endless wires each separately guided along the surface of a different one of the perforated cylinders a distance extending from a pulp suspension feeding point to at least the slit;

means attached to the frame for guiding the wires along the surface of the respective perforated cylinder from the suspension feeding point to the slit and then along the surface of only one of the cylinders from the slit to a position further along the surface of said one of the cylinders;

means attached to the frame at the pulp suspension feeding point for feeding pulp suspension onto the wire-covered surface of each perforated cylinder on which the initial formation of the web takes place and including two mutually separate and independent roof-like upper lips each covering at least part of each one of the wire-covered cylinder surfaces;

suction means, attached to the frame, for drawing water from the web while the web proceeds along the surface of said one of the cylinders from the slit to a position further along the surface of said one of the cylinders; and

means for detaching the finished web from one of the wires.

3,970,515
CONTROLLED SEQUENCE PRESSURE NIP

Leroy H. Busker, Rockton, Ill., assignor to Beloit Corporation, Beloit, Wis.

Continuation-in-part of Ser. No. 412,578, Nov. 5, 1973, abandoned, which is a continuation of Ser. No. 241,710, April 6, 1972, abandoned. This application Apr. 7, 1975, Ser. No. 565,427
Int. Cl.² D21F 3/06
U.S. Cl. 162—360 R **2 Claims**

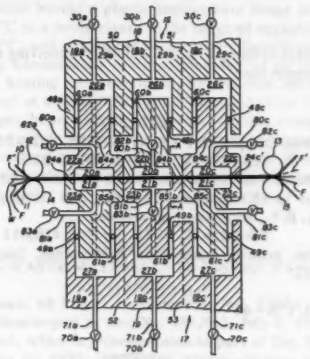
1. A press structure for performing a dewatering operation in the process of formation of a traveling fibrous web, comprising:

at least one felt for traveling with the web in water receiving contact therewith;

a pair of looped, fluid impervious belts for traveling with the web for carrying the web and felt therebetween;

first hydraulic pressure means for applying a uniform first pressure to a first area along the travel of the belts to force water from the web at a high rate of speed, said rate being less than that at which fiber crushing occurs;

second successive hydraulic pressure means immediately adjacent the first hydraulic pressure means for applying a uniform second pressure to a second area along the travel of the belts, said second pressure being greater than the first pressure and sufficient to cause additional water to flow from the web at a second rate less than the rate



at which fiber crushing occurs so that the water can flow from the web without excess water flow velocity building up within the web;

said first and second hydraulic pressure means each including a beam and a chamber housing arranged to define a hydraulic supporting chamber therebetween;

each chamber housing including a pressure chamber exposed to the traveling belts, so that pressurized fluid supplied to the supporting chamber urges the chamber housing against the traveling web and pressurized fluid applied to the pressure chamber provides water expressing force against the web; and

each beam and chamber housing being linked by a flexible diaphragm to define the peripheral walls of the supporting chamber.

3,970,516
MULTIPLE FILTER PRESS DIAPHRAGM FORMER

Barry M. Barkel, Saline; Stephen M. Collins, and William M. Herring, both of Trenton, all of Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.

Filed Dec. 23, 1974, Ser. No. 535,237
Int. Cl.² D21J 3/12
U.S. Cl. 162—382 **6 Claims**

1. A multiple filter press diaphragm former, comprising:

a. a housing,

b. at least one slurry inlet chamber disposed in the housing for issuing a slurry onto a diaphragm support base,

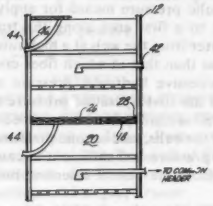
c. a rigid support screen spaced apart from and provided beneath the slurry inlet chamber, such that a diaphragm support base is accomodated between the slurry inlet chamber and the support screen,

d. at least one evacuation chamber disposed beneath the support screen,

e. means for introducing a slurry into the inlet chamber,

f. vacuum means for applying varying vacuums across the support screen through the evacuation chamber to densify the slurry issuing onto a diaphragm support base, and

g. a sealing gasket abutting the support screen and disposed between the support screen and the inlet chamber, the



gasket defining a track for slidingly receiving a diaphragm support base.

3,970,517

PROCESS OF SAFELY COMPACTING A RADIO-ACTIVE MATERIAL INTO A SOLID BODY

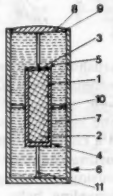
Hans Bertil Van Nederveen, Bosch en Duin, Netherlands, assignor to SKF Industrial Trading and Development Company, B.V., Jutphaas, Netherlands

Filed Jan. 2, 1974, Ser. No. 430,011

Claims priority, application Netherlands, Jan. 15, 1973, 7300552

Int. Cl.[2] G21C *3/02*

U.S. Cl. 176—66 **9 Claims**



1. A process carried out in a hot-cell which includes therein a chamber and means for drawing a partial vacuum within said chamber and an electronic-beam welding apparatus, comprising the steps carried out within said chamber and under partial vacuum conditions, of (a) filling a compressible inner container with granulated radio-active material, (b) applying said vacuum pressure to said material within said container, (c) with said welding apparatus, welding a first lid onto said container to seal same against radio-active leakage, and (d) placing said sealed inner container within a compressible outer container with a space defined between said containers and surrounding said inner container, (e) filling said space with liquid metal, and (f) welding a second lid onto said outer container to seal same, thus providing a container assembly and performing compaction on said container assembly, by applying a pressure upon said sealed outer container which being compressible applies pressure onto said liquid metal which transmits said pressure equally in all directions onto said inner container which being compressible compacts said radio-active material therein.

3,970,518

MAGNETIC SEPARATION OF BIOLOGICAL PARTICLES

Ivar Giaever, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed July 1, 1975, Ser. No. 592,195

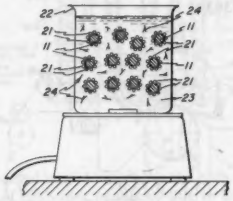
Int. Cl.[2] G01N *27/00, 33/16*

U.S. Cl. 195—1.5 **8 Claims**

1. A method for the separation of a select population of cells, bacteria or viruses from a mixed population comprising the steps of:

contacting a solution of said mixed population containing members of said select population with a plurality of small magnetic particles each of which is coated with a layer of antibodies to the select population bonded thereto,

magnetically separating said magnetic particles from said solution, said magnetic particles having on surface area



thereof members of said select population affixed as a complex to said layer of antibodies,

contacting these coated magnetic particles with said members affixed thereto with a cleaving agent solution to detach said members of the select populaton from said antibody-coated magnetic particles and

magnetically separating the antibody-coated magnetic particles from the cleaving agent solution now containing said members of the select population.

3,970,519

PROCESS FOR PRODUCING L-LEUCINE

Takayasu Tsuchida, Kawasaki; Haruo Momose, Kamakura, and Yoshio Hirose, Fujisawa, all of Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan

Filed Mar. 4, 1975, Ser. No. 555,114

Claims priority, application Japan, Mar. 15, 1974, 49-29645

Int. Cl.[2] C12D *13/06*

U.S. Cl. 195—29 **3 Claims**

1. A process for producing L-leucine which comprises cultivating a microorganism selected from the group consisting of *Brevibacterium lactofermentum* FERM-P 2516, 2517 and 1965 and *Corynebacterium glutamicum* FERM-P 1966, 1968 and 2518 in an aqueous medium containing a source of assimilable carbon and nitrogen, inorganic salts and nutriments at a pH of 5 to 9 until L-leucine accumulates in the medium, and recovering the accumulated L-leucine.

3,970,520

NUTRITIONALLY IMPROVED FOODSTUFFS

Jacob Richard Feldman, New City, N.Y.; Gerhard Julius Haas, Woodcliff Lake, N.J., and Joaquin Castro Lugay, Thornwood, N.Y., assignors to General Foods Corporation, White Plains, N.Y.

Continuation-in-part of Ser. No. 398,291, Sept. 17, 1973, abandoned, which is a continuation-in-part of Ser. No. 126,261, March 19, 1971, abandoned. This application July 28, 1975, Ser. No. 599,754

Int. Cl.[2] A23J *3/00*

U.S. Cl. 195—29 **8 Claims**

1. An improved process for preparing a bland, enzymatically hydrolyzed, soluble, nutritious, proteinaceous material comprising:

a. obtaining a protein isolate;

b. washing the isolate sufficiently to substantially remove off flavors and odors;

c. preparing a slurry of the protein isolate and water;

d. adjusting the slurry pH to between about 6 to 7;
e. adding to the slurry a proteolytic enzyme mixture of ficin, papain, and neutral protease from B. Subtilis;
f. incubating the resulting mixture for a period of time to hydrolyze the protein and solubilize from 50 to 90 percent of the protein to provide a soluble fraction having a molecular weight of from 200 to 2900;
g. terminating the incubation by heating the mixture to a temperature sufficient to inactivate the enzymes and precipitate heat-insoluble fractions of the isolate;
h. recovering the soluble protein fraction having a molecular weight from 200 to 2900; and
i. drying the soluble protein fraction.

3,970,521
IMMOBILIZED GLYCOENZYMES

Oskar R. Zaborsky, Watchung, N.J., and Allen I. Laskin, New York, N.Y., assignors to Exxon Research and Engineering Company, Linden, N.J.

Filed Aug. 7, 1974, Ser. No. 495,339
Int. Cl.² C07G 7/02
U.S. Cl. 195—63 **11 Claims**

1. A water-insoluble enzyme-polymer conjugate, comprising a glycoenzyme covalently bound to an amino-containing water-insoluble polymer through a hydrazone linkage between a carbonyl group on the enzyme and an amino group on the amino-containing water insoluble polymer.

5. A method for immobilizing a glycoenzyme which comprises oxidizing the carbohydrate portion of the glycoenzyme at conditions whereby at least one carbonyl group or acetal group is formed and coupling the oxidized glycoenzyme to an amino-containing water-insoluble material by reacting a carbonyl group of the glycoenzyme with an amino group of the water-insoluble material to cause coupling of the glycoenzyme to the water-insoluble material through a hydrazone or imine linkage to produce a water-insoluble immobilized glycoenzyme-amino conjugate.

3,970,522
METHOD FOR THE PRODUCTION OF D-RIBOSE

Ken-ichi Sasajima, Hyogo; Muneharu Doi; Teruo Fukuhara, both of Osaka; Akira Yokota, Kyoto; Yoshio Nakao, Osaka, and Masahiko Yoneda, Kobe, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Nov. 25, 1974, Ser. No. 527,145
Claims priority, application Japan, Nov. 23, 1973, 48-131955; Mar. 18, 1974, 49-31357
Int. Cl.² C12D 13/02
U.S. Cl. 195—112 **13 Claims**

1. A method of producing D-ribose, which comprises cultivating a microorganism belonging to the genus Bacillus in a culture medium containing assimilable carbon and nitrogen sources and factors necessary for growth of the microorganism, causing the microorganism to elaborate and accumulate D-ribose, and recovering the D-ribose thus accumulated from the resultant culture broth, said microogranism having at least one property selected from the group consisting of (1) a sporulation frequency not more than 10^{-4} and (2) a 2-deoxy-D-glucose-oxidizing activity within the range from 0.05 to 1.00 μ mole/min./mg. protein, and said microorganism also having at least one property selected from the group consisting of (3) a transketolase activity of not more than 0.01 μ mole/min./mg. protein and (4) a D-ribulose phosphate 3-epimerase activity of not more than 0.01 μ mole/min./mg. protein.

3,970,523
PROCESSES OF PRODUCING COKES OF LARGE LUMP SIZE AND IMPROVED STRENGTH FROM BITUMINOUS COALS

Kurt-Günther Beck; Wolfgang Rohde; Heinrich Echterhoff, all of Essen, and Gerd Nashan, Oberhausen, all of Germany, assignors to Bergwerksverband GmbH, Essen, Germany

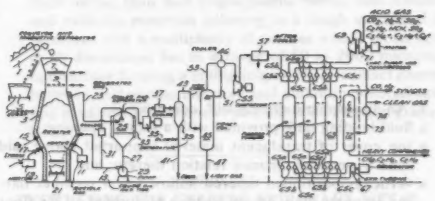
Continuation of Ser. No. 350,466, April 12, 1973, abandoned. This application Dec. 20, 1974, Ser. No. 534,897
Claims priority, application Germany, Nov. 24, 1972, 2257668
Int. Cl.² C10B 57/02
U.S. Cl. 201—1 **10 Claims**

1. A process for the production of coke from coal, particularly from bituminous coal, comprising the steps of preliminarily heating coal having a plastic temperature range of about 350° to 550°C to a temperature in the range of approximately 160° to 250°C; and coking the preliminarily heated coal in a substantially horizonatally oriented chamber of an oven by additionally heating the preliminarily heated coal, the coking being effected at a mean coking rate between about 1.2 and 2.8 inches per hour, and the additional heating comprising maintaining the rate of temperature increase as measured in the region of the center of the chamber between about 1.6° and 3.3° centigrade per minute in the plastic temperature range of the coal.

3,970,524
TREATING WASTE MATERIALS TO PRODUCE USABLE GASES

Harald F. Funk, 68 Elm St., Murray Hill, N.J. 07974

Continuation-in-part of Ser. No. 486,562, July 8, 1974, abandoned, which is a continuation-in-part of Ser. No. 252,610, May 12, 1972, abandoned. This application Apr. 4, 1975, Ser. No. 565,045
Int. Cl.² C10B 31/02, 51/00, 21/18, 57/12
U.S. Cl. 201—2.5 **12 Claims**



1. The process of converting solid waste into useful fluids while preventing substantial air and water pollution which comprises the steps of:

a. maintaining a retort, constituting part of a closed system, partly filled with shredded solid waste by charging such waste into the retort through an opening in the upper part thereof while preventing escape of gases through said opening,
b. partially oxidizing and combusting said shredded solid waste in a combustion zone in the lower part of the retort and adjusting the heating value and composition of the resulting gases by controlling the temperature in said zone and by varying the volume and temperature of fuel and oxygen brought into said zone,
c. volatilizing and distilling moisture and fluids on and in the shredded solid waste by conducting said gases from said zone up through and in intimate contact with said shredded solid waste thereabove,
d. withdrawing from the upper part of the retort mixed gases including the gases resulting from the said oxidizing and combusting of said shredded solid waste and the volatilized and distilled moisture and fluids of the shredded waste,

e. compressing gases withdrawn from said retort to about 50 psig and cooling them to an ambient temperature of about 20°C.,

f. passing the thus compressed and cooled gases through a chamber in intimate contact with heat absorbing means and separating them into their condensable and non-condensable components, and

g. separating and removing the non-condensable component and revaporizing the condensed component.

3,970,525

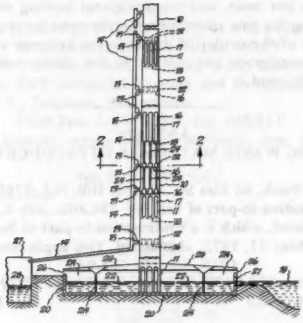
ATMOSPHERIC EFFECTS STILL

John A. Kurek, 138 James St., Buffalo, N.Y. 14210

Filed Nov. 27, 1974, Ser. No. 524,244

Int. Cl.² B01D *3/02*

U.S. Cl. 202—174 **1 Claim**



1. An atmospheric effects still, comprising:

a fluid holding tank provided with a supply opening;

a top cover of translucent material supported above said tank in vertically-spaced relation thereto; and

a vertically-positioned tapered hollow tower member having an outer shell, having its base positioned on the floor of said tank, and having an intermediate portion of its vertical extent penetrating said cover, said shell having openings adjacent said base to permit fluid in said tank to enter said tower member, said tower member also having a plurality of vertically-spaced sections of decreasing cross-sectional area, each of said sections including a lower horizontal closure plate, an upper horizontal closure plate, and a plurality of vertically-positioned open tubes having their outer surfaces exposed to atmospheric temperature, each of said tubes having its lower end arranged to penetrate said closure plate and having a marginal portion adjacent its upper end extending beyond said upper collector plate to define a liquid trap chamber above said collector plate, said tower member also having a drain arranged to direct a flow of condensed water accumulating on said collector plates away from said tower member, and a plurality of vertically-disposed condenser tubes arranged in said tower member;

whereby solar energy may pass through said top cover to heat fluid in said tank, to cause heated moisture-laden air to rise upwardly through said tower member, and to cause water to condense within said tubes and on said condenser tubes and flow from said tower member through said drain.

3,970,526

CLOSED TANK COKE CAR CONSTRUCTION

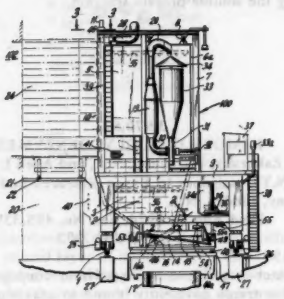
Martin Bender, Dusseldorf; Johannes Knappstein, and Josef Stratmann, both of Recklinghausen, all of Germany, assignors to Firma Carl Still, Firma Hartung, Kuhn & Co. GmbH; both of Germany

Filed Aug. 6, 1974, Ser. No. 495,204

Claims priority, application Germany, Aug. 9, 1973, 2340256

Int. Cl.² C10B *39/14*

U.S. Cl. 202—227 **10 Claims**



1. A closed tank car for receiving and transporting incandescent coke through a coke guide car from the oven chambers of horizontal coke oven batteries to a quenching station, comprising a tank having a hood portion with a lateral coke entrance opening capable of being closed, said entrance opening having the height and width of the coke cake to be received, and adapted to be connected to the coke guide car, said tank having a closeable bottom outlet opening for the coke adapted to be connected to the quenching station, and suction, washing, and separating means for the dusts, gases and fumes produced during the discharge from the oven chambers into the tank car and during the discharge from the tank car into the quenching station connected to said tank, a movable undercarriage, said tank being supported on said movable undercarriage, a tank support frame on said undercarriage, said tank having walls of heat-resistant metal plates which are suspended from said support frame in loosely adjacent layers and overlap one another on all sides, said hood portion comprising a heat-resistant framed steel structure in which said heat-resistant metal plates are arranged in layers and overlapping one another, and strips carried by said support frame secured to said plates.

3,970,527

ELECTROFORMATION OF THE RUNNING TRACK OF A ROTARY INTERNAL COMBUSTION ENGINE

Henry Brown, Sarasota, Fla., assignor to Oxy Metal Industries Corporation, Warren, Mich.

Continuation-in-part of Ser. No. 316,207, Dec. 18, 1972, Pat. No. 3,856,635, which is a continuation of Ser. No. 421,302, Dec. 3, 1973. This application Mar. 27, 1975, Ser. No. 562,609

Int. Cl.² C25D *1/02, 1/20*

U.S. Cl. 204—9 **15 Claims**

1. A method for forming a housing comprised essentially of aluminum for the running track of a rotary internal combustion engine which comprises the steps of:

1. electrodepositing a first layer on to a mandrel of the shape of the running track of the rotor, said mandrel having a chromium surface, and said first layer deposited thereon being a metal selected from the group consisting essentially of nickel, cobalt, iron and their alloys and being separable from the mandrel during subsequent steps;

2. electrodepositing a wear-resistant layer on to said first layer
3. then casting a housing comprised essentially of aluminum; and
4. separating the housing from the mandrel with a chromium surface.

3,970,528

PROCESS FOR THE PURIFICATION OF ELECTROLYSIS BRINE

Eberhard Zirngiebl, Cologne, and Alfred Irlenkäuser, Leverkusen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Oct. 20, 1975, Ser. No. 624,213

Claims priority, application Germany, Oct. 23, 1974, 2450259

Int. Cl.² C25B *1/16, 1/26;* C01F *5/22*

U.S. Cl. 204—98 **7 Claims**

1. A process for purifying electrolysis brine comprising dividing the electrolysis brine into first and second streams, adding calcium chloride to the second stream thereby substantially quantitatively to obtain a first precipitate comprising calcium sulfate in the form of $CaSO_4 \cdot 2\ H_2O$ with some magnesium compound admixed therewith, separating off the first precipitate, combining the second stream freed from the first precipitate with the first stream, adding sodium carbonate and alkali hydroxide to the re-combined streams thereby substantially quantitatively to obtain a second precipitate comprising calcium and any magnesium present therein, the calcium being present as $CaCO_3$ in said second precipitate and any magnesium being present as $Mg(OH)_2$, separating off the second precipitate to leave a purified brine, introducing the purified brine into the electrolysis cell, reacting the $CaSO_4 \cdot 2\ H_2O$ first precipitate under pressure with sodium hydroxide and CO_2 to form $CaCO_3$ and $Na_2SO_4 \cdot 10\ H_2O$, removing the $Na_2SO_4 \cdot 10\ H_2O$, reacting the $CaCO_3$ with hydrochloric acid to form CO_2 and a solution of $CaCl_2$ having some magnesium compound dissolved therein, and recycling the $CaCl_2$ to react with a further quantity of said second stream.

3,970,529

ELECTROPOLISHING ALUMINUM AND ALUMINUM ALLOYS

Sylvia Martin, Detroit, Mich., assignor to Oxy Metal Industries Corporation, Warren, Mich.

Filed Apr. 30, 1975, Ser. No. 573,186

Int. Cl.² C25F *3/00*

U.S. Cl. 204—129.9 **8 Claims**

1. In a method of anodically electropolishing articles formed of aluminum and aluminum alloys to obtain a full bright, polish surface, which comprises the steps of:
   a. immersing the article as the anode in a bath comprising from about 95% to about 30% by volume concentrated phosphoric acid and from about 5% to about 70% by volume of a polymer selected from the group consisting of poly (alkylene ether) having at least four ether groups and derivatives thereof, and
   b. operating the bath at a temperature of from about 150° to about 200°F at a current density of from about 30 a.s.f. to about 150 a.s.f. and at about 15 to about 100 volts, until the surface of said article is polished.

3,970,530

METHOD OF AND SYSTEM FOR THE DESTRUCTION AND/OR LIMITATION OF THE REPRODUCTION OF MICRO-ORGANISMS IN NUTRITIVE MEDIA

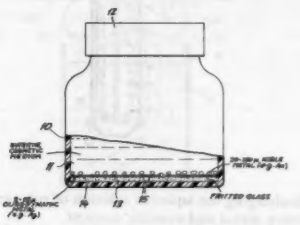
Bohdan Maslowski, Chene-Bougeries, Geneva, and Dimitri Tzanos, Grand-Lancy, Geneva, both of Switzerland, assignors to Battelle Memorial Institute, Carouge, Geneva, Switzerland

Filed Aug. 6, 1974, Ser. No. 495,257

Claims priority, application Switzerland, Aug. 6, 1973, 11350/73

Int. Cl.² A23B *7/00*

U.S. Cl. 426—237 **9 Claims**



1. A method of checking the growth of micro-organisms in an electrically conductive medium contaning nutrients conductive to the proliferation of such micro-organisms, comprising the steps of:
   placing said medium in a container for prolonged storage; and
   contacting said medium in said container with an anodic and a cathodic material constituting electrical couples for the autosolubilization in said medium of an oligodynamic transistion metal forming part of said anodic material, said cathodic material consisting of at least one metal more noble than said oligodynamic metal, said anodic and cathodic materials adhering to a rough surface of a substrate with a multiplicity of cavities whose mean size in all dimensions lies in a range of 50 to 2000 microns, said surface forming a multiplicity of triple-contact points between said anodic material, said cathodic material and said medium, at least one of said materials being in granular form.

3,970,531

DECREASING THE CYANIDE AND HEAVY METAL CONTENT OF AN AQUEOUS SOLUTION

Howard L. Recht, Northridge, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

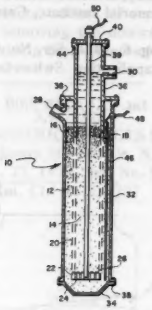
Division of Ser. No. 503,198, Sept. 4, 1974. This application Nov. 28, 1975, Ser. No. 635,813

Int. Cl.² C02B *1/82;* C25F *7/00, 7/02*

U.S. Cl. 204—149 **4 Claims**

1. A method of concurrently reducing the heavy metal and cyanide content of an aqueous solution containing the same comprising:
   a. passing the aqueous solution sequentially through a bed of electrically conductive particles contained in a first compartment and then through a bed of electrically conductive particles contained in a second compartment of an electrolytic cell, said first compartment being separated from said second compartment by an electronically nonconductive foraminous member, said foraminous member having a plurality of openings, said openings having a median size within the range of from about 10^{-6} to 10^{-14} square centimeters;
   b. maintaining an applied potential of from about 1.0 to 10 volts between said first and second compartments whereby a direct electrical current flows between said compartments through said foraminous member and the

heavy metal is deposited upon the electrically conductive particles in one of said compartments and the cyanide is oxidized in the other of said compartments, and



c. discharging the aqueous solution of substantially reduced heavy metal and cyanide content.

3,970,532

2-HYDROXYETHYLPHOSPHINES

Ingenuin Hechenbleikner, West Cornwall, and William Palmer Enlow, Falls Village, both of Conn., assignors to Borg-Warner Corporation, Chicago, Ill.

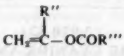
Filed Jan. 16, 1975, Ser. No. 541,542

Int. Cl.² B01J 1/10, 1/12

U.S. Cl. 204—158 R **8 Claims**

1. A process for the preparation of 2-hydroxyalkylphosphines comprising the steps of (1) the reaction of a phosphine having the structural formula

where R and R′ are hydrogen, alkyl, aryl, cycloalkyl or aralkyl, with an alkenyl carboxylate having the structural formula



where R″ is hydrogen or methyl, and R‴ is a saturated aliphatic hydrocarbon group of 1–17 carbon atoms, in the presence of (a) from about 0.01% to about 5.0% of a non-oxidizing aliphatic initiator having less than 30 carbon atoms, and (b) light having a wave length between 2000A. and 4000A., at a temperature which ranges from 10°C to about 50°C, to form a 2-acyloxyphosphine, and (2) the subsequent alcoholysis or hydrolysis of said 2-acyloxyalkylphosphine to the corresponding 2-hydroxyalkylphosphine.

3,970,533

PROCESS FOR CONVERSION OF ELASTOMERIC PHOSPHAZENE

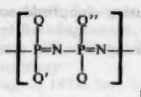
Gary Stephen Kyker, Uniontown; Thomas Anthony Antkowiak, Rittman, and Adel Farhan Halasa, Bath, all of Ohio, assignors to The Firestone Tire & Rubber Company, Akron, Ohio

Continuation of Ser. No. 405,236, Oct. 10, 1973, abandoned. This application June 30, 1975, Ser. No. 592,005

Int. Cl.² C08F 8/00; C08G 33/16

U.S. Cl. 204—159.14 **17 Claims**

1. Phosphonitrilic fluoroelastomer represented by the general formula:



wherein each of Q and Q′ represent a fluoroalkoxy group represented by the formula $-OCH_2C_nF_{2n}Z$ in which n is an integer from 1 to 10 and Z represents H or F; and Q and Q′ are not required to be the same and there may be more than two such groups;

and Q″ represents an o-allylphenoxy group;

the groups Q, Q′ and Q″ being randomly distributed along the —P=N—P=N— chain.

3,970,534

GRAFT COPOLYMER AND PROCESS FOR PREPARATION THEREOF

Hiroshi Fujiwara; Koichi Asano; Akio Sugishita, all of Soka, and Asao Takahashi, Saitama, all of Japan, assignors to Maruzen Oil Co. Ltd., Osaka, Japan

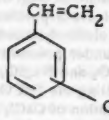
Filed Jan. 13, 1975, Ser. No. 540,789

Claims priority, application Japan, Jan. 11, 1974, 49-6373; Jan. 11, 1974, 49-6374

Int. Cl.² C08F 2/46, 255/00, 257/02

U.S. Cl. 204—159.17 **25 Claims**

1. A graft copolymer comprising a hydrocarbon polymer main chain and a side chain composed mainly of a styrene compound of the following general formula (I)



(I)

wherein R is a hydrogen atom or an R′CO group, in which R′ is a hydrocarbon group having 1 to 20 carbon atoms, and a polyene compound containing at least two polymerizable double bonds in the molecule grafted to the hydrocarbon polymer main chain, the grafting ratio of said styrene compound being about 0.1 to 500% and the grafting ratio of said polyene compound being about 0.1 to 100% based on the weight of the hydrocarbon polymer.

3,970,535

PHOTOPOLYMERIZATION PROCESS UTILIZING A 2-METHYL-SUBSTITUTED BENZIMIDAZOLE AS A PHOTOSENSITIZER

Vincent Daniel McGinniss, Valley City, Ohio, assignor to SCM Corporation, Cleveland, Ohio

Filed June 12, 1974, Ser. No. 478,572

Int. Cl.² C08F 8/18, 8/34

U.S. Cl. 204—159.18 **8 Claims**

1. In a process for photopolymerizing a polymerizable ethylenically unsaturated vehicle, wherein said vehicle is photosensitized by incorporating thereinto a photosensitizer and exposing the photosensitized vehicle to a source of ultraviolet radiation, the improvement which comprises incorporating as a photosensitizer into said vehicle a substituted 2-methyl benzimidazole compound wherein the substituent is attached to

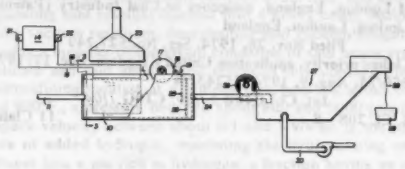
the 2-methyl carbon, said photosensitizer is the amount of about 0.5 to about 10% by weight, based on the weight of the vehicle.

3,970,536

LIQUID TREATING METHOD AND APPARATUS

Don L. Shettel, Bloomfield Hills, Mich., assignor to Hydromation Filter Company, Livonia, Mich.

Filed Aug. 22, 1974, Ser. No. 499,670
Int. Cl.² C25B 7/00
U.S. Cl. 204—180 R **9 Claims**



1. In a method of separating an electrically conductive liquid from contaminants suspended therein, comprising the steps of:
   1. flowing an electrically conductive liquid contaminated by suspended contaminants having electrical surface charges, between an electrically charged cell comprised of a plurality of generally vertical, substantially parallel, relatively inert spaced surfaces, the alternate surfaces constituting a first set of surfaces for receiving an electrical charge and the other surfaces constituting a second set of surfaces for receiving an opposite electrical charge;
   2. electrically interconnecting the cell to a substantially constant DC power source to establish an identical, substantially constant positive electrical charge on each surface in one of said sets of surfaces and an identical, substantially constant negative electrical charge on each surface of the other of said surfaces;
   3. electrophoretically attracting at least a portion of the contaminants in said liquid generally horizontally toward one set of said vertically arranged charged surfaces to effect a contaminant migration;
   4. agglomerating at least a portion of the attracted contaminants between the vertically arranged first and second sets of surfaces as a result of the migration in Step (3);
   5. simultaneously with Steps (3) and (4) electrolytically generating minute gaseous bubbles with surfaces of the cell and floating said bubbles vertically between the surfaces through the agglomerated contaminants toward the surface of the liquid; and
   6. entraining at least a portion of the agglomerated contaminants in the bubble flotation.

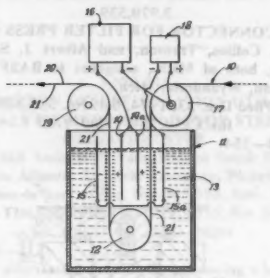
3,970,537

ELECTROLYTIC TREATING APPARATUS

Griff W. Froman, St. John, and Albert Ray Mullins, Portage, both of Ind., assignors to Inland Steel Company, Chicago, Ill.

Division of Ser. No. 378,206, July 11, 1973, Pat. No. 3,901,771. This application Apr. 14, 1975, Ser. No. 567,703
Int. Cl.² C25D 5/02, 7/06, 17/12
U.S. Cl. 204—211 **5 Claims**

1. In an apparatus for continuously electrolytically treating an endless wide strip of an electrically conductive material including an electrolytic tank adapted to hold an electrolyte bath and having associated therewith guide means for guiding the said strip continuously into and out of the interior of the tank between spaced anodic and cathodic electrodes, the improvement comprising;
   a. all said anodic electrodes being disposed within said tank directly facing only one wide surface of said endless strip,
   b. all said cathodic electrodes being disposed within said tank directly facing only the opposite wide surface of said endless strip,
   c. each said anodic electrode being connected with the positive terminal of a first source of direct current,
   d. each said cathodic electrode being connected with the negative terminal of a second source of direct current which is independent of said first source of direct current,



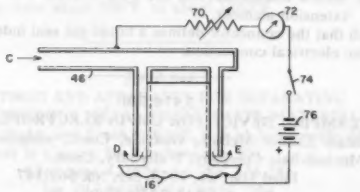
   e. each said source of direct current having the respective negative and positive electrical terminals thereof electrically connected with said endless strip, and
   f. each said source of direct current having means for independently regulating the magnitude of the direct currents supplied to said electrodes and strip.

3,970,538

APPARATUS FOR ELECTRO-CHEMICAL MILLING OF TURBINE BLADE EDGES

Joseph G. Lucas, Trumbull, Conn., assignor to Avco Corporation, Stratford, Conn.

Filed Mar. 19, 1975, Ser. No. 559,749
Int. Cl.² C25F 3/02, 3/14, 7/00
U.S. Cl. 204—224 M **3 Claims**



1. Apparatus for electro-chemical milling of the edges of integrally cast blades used in turbine engines, comprising:
   an electrically insulated tool casing body having a slot formed in one end thereof, said slot sized to allow insertion of one of said blades therein;
   two hollow electrically-conductive metallic tubes positioned within said tool casing body along each lengthwise edge of said slot, each of said tubes having a slit through its inward facing side wall to provide communication between the center of said tubes and said slot;
   indexing means for centering said blade within the slits in the metallic tubing at said slot edges;
   means for accurately positioning each of said integrally cast blades in said tool casing body, said means comprising the forming of spaced apart reference slots and surfaces in the tool casing body, the shape of said slots and said surfaces being complementary to the contour of adjacent blade elements of said integrally cast blade assembly whereby close dimensional and blade-to-blade pitch tol-

erance can be maintained during electro-chemical milling;

clamping means for holding said blade in its indexed position within said tool casing body;

means for supplying a flow of electrolyte to each of said tubes; and

voltage supply means for establishing a current flow between each of said metallic tubes and said blade.

3,970,539

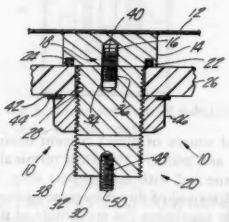
END CONNECTOR FOR FILTER PRESS CELL

Stephen M. Collins, Trenton, and Albert J. Schweickart, Southgate, both of Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.

Filed Dec. 23, 1974, Ser. No. 535,325

Int. Cl.² C25B *11/00, 1/00*

U.S. Cl. 204—254 **8 Claims**



1. In a bipolar electrolytic filter press cell of the type having an anode and a cathode, each electrode having a boss member associated therewith and a central web interposed between the anode and cathode, an improved end connector therefor, comprising:

a. a boss extension member which matingly engages the surface of the boss member remote from an associated electrode,

b. a pressure collar mounted on the boss extension member, and

c. means interconnecting the boss member and the boss extension member,

such that the connector defines a liquid-gas seal independent of an electrical connection.

3,970,540

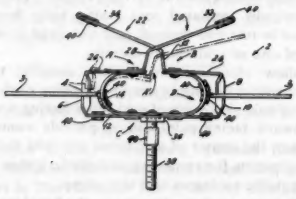
CLAMPING DEVICE FOR USE IN ELECTROPLATING

William Lander McBain, Oakville, Conn., assignor to The Mitchell-Bate Company, Waterbury, Conn.

Filed Mar. 26, 1975, Ser. No. 562,147

Int. Cl.² C25D *17/04*

U.S. Cl. 204—297 W **12 Claims**



1. A clamping device for gripping an object, comprising:

a. a support;

b. two elements on said support each having an object-engaging portion comprising a section having an elongated edge surface, said respective edge surfaces facing and at least partially registering with each other in substantially parallel horizontal planes and being in relatively skewed vertical planes;

c. resilient means operatively connected to said elements for biasing said object-engaging portions toward and into engagement with each other; and

d. means operatively connected to at least one of said elements for deforming said resilient means to separate said object-engaging portions.

3,970,541

GAS EXTRACTION OF COAL

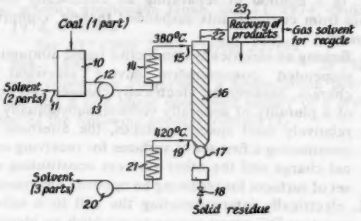
Derek Farnham Williams, and John Charles Whitehead, both of London, England, assignors to Coal Industry (Patents) Limited, London, England

Filed Nov. 26, 1974, Ser. No. 527,249

Claims priority, application United Kingdom, Dec. 17, 1973, 58350/73; Aug. 9, 1974, 35243/74

Int. Cl.² C10B *57/00*; C10G *1/04*

U.S. Cl. 208—8 **11 Claims**



1. A process for the gas extraction of soluble constituents of coal which process comprises the steps of heating the coal in the presence of an extraction solvent at an initial rate of at least 20°C. per minute to an intermediate temperature of 370°–390°C., thereafter heating said heated solvent-coal mixture at a second rate of less than 20°C. per minute to a terminal temperature range of 400°C. to 550°C., said second rate of heating minimizing secondary polymerization reactions; said solvent at the terminal temperature range being in the gaseous phase, separating the extractant from the residue and thereafter recovering the extract from the extractant.

3,970,542

METHOD OF PREPARING ELECTRODE PITCHES

Pieter Jan Willem Bongertman, Uithoorn, Netherlands, assignor to Cindu N.V., Yithoorn, Netherlands

Continuation of Ser. No. 286,907, Sept. 7, 1972, abandoned. This application Nov. 15, 1974, Ser. No. 524,147

Claims priority, application Netherlands, Sept. 10, 1971, 7112518

Int. Cl.² C10C *3/00*

U.S. Cl. 208—22 **9 Claims**

1. A method of preparing electrode pitch consisting essentially of mixing

a. a highly aromatic residual fraction produced by steam cracking a gas oil or naphtha at a temperature in excess of 750°C and fractionating to separate said residual fractions with

b. a coal tar pitch in a weight ratio of 1:9 to 9:1 and

heating said mixture at a temperature of above 350° to 400°C for about 5½ hours to about 17 hours.

3,970,543

PRODUCTION OF LUBRICATING OILS

Herbert A. McIntosh, Houston, Tex., assignor to Texaco Inc., New York, N.Y.

Continuation of Ser. No. 302,166, Oct. 30, 1972, abandoned. This application Oct. 2, 1974, Ser. No. 511,132

Int. Cl.[2] C10G *21/00, 23/00*

U.S. Cl. 208—86 8 Claims

1. A process for the production of a lube blend of improved viscosity index which comprises subjecting a crude petroleum oil to distillation to produce a light lube oil distillate having an initial boiling point between about 600° and 650°F. and an end point between about 800° and 850°F. and a residual fraction having an initial boiling point between about 800° and 850°F., separating said residual fraction into a heavy crude distillate and a vacuum residuum, deasphalting said vacuum residuum, passing a member of the group consisting of said heavy crude distillate and said deasphalted residuum into contact with a hydrorefining catalyst at a temperature between about 600° and 900°F., a pressure between about 800 and 5000 psig and a space velocity between about 0.1 and 5 v/v/hr. in the presence of added hydrogen, separating the hydrorefining zone effluent into a gas rich in hydrogen, a fraction having an end point between about 600° and 650°F. and a hydrorefined lube oil fraction having an initial boiling point between about 600° and 650°F., separating from said hydrorefined lube oil fraction a light hydrorefined fraction having an initial boiling point between 600° and 650°F. and an end point between about 800° and 850°F. and blending with said hydrorefined lube oil fraction having an initial boiling point between about 800° and 850°F. said light lube oil distillate in an amount between 50 and 200 percent by volume of said light hydrorefined fraction to produce a lube oil blend having a viscosity index higher than either said hydrorefined lube oil fraction or said light lube oil distillate.

3,970,544

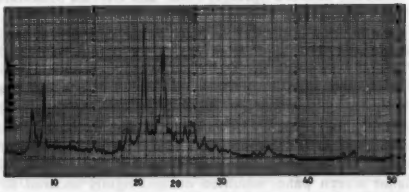
HYDROCARBON CONVERSION WITH ZSM-12

Edward Joseph Rosinski, Pedricktown, N.J., and Mae Koenig Rubin, Bala Cynwyd, both of Pa., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 467,334, May 6, 1974, abandoned, which is a division of Ser. No. 125,749, March 18, 1971, Pat. No. 3,832,449. This application Feb. 28, 1975, Ser. No. 553,950

Int. Cl.[2] C10G *13/02, 11/04;* B01J *29/28*

U.S. Cl. 208—111 7 Claims



1. A process for conversion of a hydrocarbon charge which comprises contacting said charge under conversion conditions with a catalyst comprising a zeolite the X-ray powder diffraction pattern of which manifests the interplanar spacings set forth in Table 1 of the specification when the zeolite is in the sodium-tetraethylammonium cationic form, said zeolite having, in terms of mole ratios of oxides, the formula:

$$1 \pm 0.4\ M_{2/n}O:\ W_2O_3:\ 20\text{–}200YO_2:\ zH_2O$$

wherein M is at least one cation having a valance n, z is between 0 and 60, W is aluminum or gallium and Y is silicon or germanium.

3,970,545

HYDROCARBON DESULFURIZATION UTILIZING A NON-CATALYTIC HYDROGEN DONOR STEP AND AN OXIDATION STEP

Jin S. Yoo, and Andrew P. Voss, both of South Holland, Ill., assignors to Atlantic Richfield Company, Philadelphia, Pa.

Continuation-in-part of Ser. No. 305,595, Nov. 10, 1972, abandoned. This application Mar. 19, 1975, Ser. No. 559,891

Int. Cl.[2] C10G *23/02, 27/04*

U.S. Cl. 208—212 16 Claims

1. In a desulfurization process for producing a hydrocarbon product of reduced sulfur content from a sulfur-containing hydrocarbon feedstock a major portion of which boils above about 550°F., wherein a portion of said contained sulfur is preferentially oxidized and said oxidized sulfur-containing hydrocarbon feedstock is treated to remove at least a portion of the oxidized sulfur and wherein said hydrocarbon product of reduced sulfur content is recovered, the improvement which comprises heating said sulfur-containing hydrocarbon feedstock prior to the oxidation step with at least one liquid hydrocarbon compound capable of transferring hydrogen to said sulfur-containing hydrocarbon feedstock without the presence of a catalyst under conditions such that hydrogen which is transferred from at least a portion of said liquid hydrocarbon compound is reacted with said sulfur-containing hydrocarbon feedstock to form hydrogen sulfide, said heating being conducted at a ratio of 100 parts by weight of said sulfur-containing hydrocarbon feedstock to from about 5 parts to about 2000 parts by weight of said hydrocarbon compound, and said heating being conducted at a temperature in the range from about 500°F. to about 1350°F.

3,970,546

METHOD AND APPARATUS FOR SEPARATING NON-FERROUS METAL FROM WASTE MATERIAL

Clyde B. Webb, and Frank S. Knoll, both of Jacksonville, Fla., assignors to Carpco, Inc., Jacksonville, Fla.

Filed June 4, 1974, Ser. No. 476,281

Int. Cl.[2] B03B *1/00;* B03C *7/04*

U.S. Cl. 209—3 25 Claims

1. A method for separating non-ferrous metal from waste material comprising non-ferrous metal and low conductivity conductive material; said method comprising the steps of:

a. sizing the waste material to a particle size not more than about 4 inches;

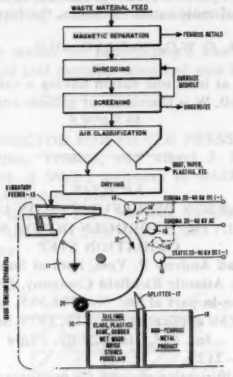
b. feeding the sized waste material particles to a grounded electrode;

c. pinning the waste material particles to said grounded electrode by subjecting the waste material particles to ion bombardment from a D.C. corona discharge electrode;

d. maintaining the low conductivity conductive particles pinned to said grounded electrode by subjecting the waste material particles to discharge from an A.C. corona discharge electrode;

e. inducing a charge, opposite in polarity to said D.C. corona discharge electrode, on the non-ferrous metal particles and attracting the non-ferrous metal particles away from said grounded electrode by subjecting the waste material particles to an electrostatic field imposed be-

tween a static D.C. electrode and said grounded electrode; said static D.C. electrode having the same polarity



as said D.C. corona discharge electrode; and

f. collecting the non-ferrous metal particles.

3,970,547

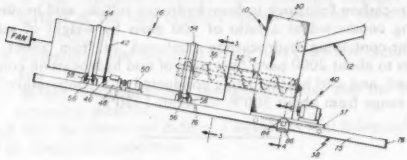
AIR CLASSIFICATION APPARATUS

Michael J. Theodore, Weston, Mass.; Malcolm M. Paterson, Atkinson, N.H., and Vernon L. Schrimper, Cedar Rapids, Iowa, assignors to Raytheon Company, Lexington, Mass.

Filed May 22, 1975, Ser. No. 580,374

Int. Cl.[2] B07B *4/06*

U.S. Cl. 209—136 **12 Claims**



1. A rotary drum classifier means for separating materials comprising a base, an open-ended drum mounted on said base for rotation about its axis, a hopper mounted on said base in spaced relation to one end of the drum and adapted to receive mixed materials to be separated, conveying means having one end attached to said hopper and the other end disposed within the drum for transporting materials from the hopper into the drum, and means for moving said conveying means longitudinally of the drum for adjusting the position of the end of the conveying means within the drum.

3,970,548

APPARATUS FOR SCREENING PAPER FIBER STOCK

Peter Seifert, and David E. Chupka, both of Middletown, Ohio, assignors to The Black Clawson Company, Middletown, Ohio

Continuation-in-part of Ser. No. 391,574, Aug. 27, 1973, abandoned. This application June 2, 1975, Ser. No. 582,867

Int. Cl.[2] B07B *1/20*

U.S. Cl. 209—240 **6 Claims**

1. Screening apparatus for fiber suspensions comprising:

a. a housing,

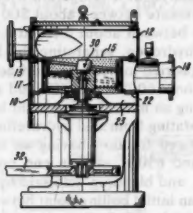
b. a cylindrical screen member within said housing having perforations therethrough and separating the interior thereof into a supply chamber and an accepts chamber on the inside and outside respectively of said screen member,

c. inlet means for supplying the suspension to one end of said supply chamber for flow therethrough and screening passage of some thereof through said perforations to said accepts chamber,

d. reject outlet means for continuously withdrawing a portion of the suspension from the other end of said supply chamber,

e. rotor means including a hub and vanes movable in said supply chamber along a cylindrical path concentric with said screen member,

f. means for supporting each of said vanes on said rotor hub in radially inwardly spaced relation with the inner surface of said screen member whereby rotation of said rotor means causes said vanes to define with said screen member an annular space adapted to be filled with suspension,



g. means for driving said rotor means to cause said vanes to travel along said path and thereby to cause the suspension in said annular space between said vanes and said screen member to circulate along the surface of said screen member,

h. said supporting means for each said vane including only arm means rigidly secured to said vane and said hub,

i. each said arm means being an essentially imperforate member of sufficiently greater axial extent than the length of any stringy material which can normally be expected to be present in the suspension to minimize the possibility of stringy material folding thereover, and

j. each said arm member presenting a leading surface functioning as a blade causing continuous circulation of the suspension about the center of said supply chamber in the annular space between said vanes and said hub.

3,970,549

SCREEN ASSEMBLY AND DEWATERING TECHNIQUE

Robert E. Ennis, West Simsbury, Conn., and Robert G. Derrick, Buffalo, N.Y., assignors to Linatex Corporation of America, Stafford Springs, Conn. and Derrick Manufacturing Corporation, Buffalo, N.Y.

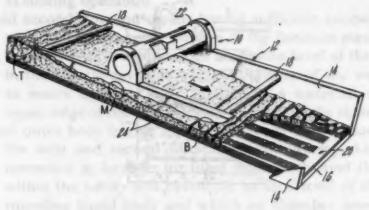
Continuation-in-part of Ser. No. 371,170, June 18, 1973, abandoned. This application Jan. 2, 1975, Ser. No. 538,023

Int. Cl.[2] C10G *5/00*

U.S. Cl. 209—341 **17 Claims**

1. A nonadjustable self-cleaning dewatering screen panel assembly for vibratory dewatering of fine granular material passing across the assembly in a first direction, said assembly being comprised of a rigid frame member and a substantially planar screen panel mounted on and rigidly secured to the frame for nonadjustable retention within the plane of the frame during vibration of the assembly, said panel being a unitary one piece member composed of elastomeric material throughout its depth and consisting essentially of a plurality of pulsator columns and integral stabilizer portions bordering the pulsator columns, said pulsator columns and stabilizer portions extending substantially parallel to said first direction, said stabilizer portions being secured to the frame to prevent relative movement therebetween, said pulsator columns being comprised of a multitude of substantially identical diaphragm

elements arranged in intimate aligned confronting relationship so as to present a smooth top screening and dewatering surface, said elements extending through the full depth of the panel and defining a column of spaced parallel slits between individual abutting elements to permit limited and random pulsating motion of the diaphram elements within the plane of the screen assembly in response to vibratory motion of the assembly, said elements extending transversely to said first direction, said panel being uniformly tensioned within its



plane in both said first direction and transversely of said first direction to effect a taut condition and uniformity of slit opening within the panel while maintaining the rigidity required to support the load passing thereacross, said panel being mounted within said rigid frame in its taut bidirectionally tensioned condition and being fixedly and positively secured to the frame about its entire periphery in its taut condition to prevent movement of the panel out of the plane of the frame during vibratory motion of the assembly.

3,970,550

MOULDED ELASTOMERIC SCREEN MAT FOR SIEVING DEVICES

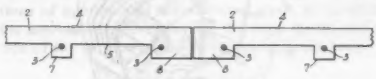
Sidney Fry, Cleckheaton; Terence Edward Crabtree, Brighouse, and Brian Rothery, Queensbury, all of England, assignors to BBA Group Limited, Checkheaton, England

Continuation of Ser. No. 327,448, Jan. 29, 1974, abandoned. This application June 7, 1974, Ser. No. 477,263

Claims priority, application United Kingdom, Jan. 28, 1972, 4161/72

Int. Cl.² B07B *1/49*

U.S. Cl. 209—399 **6 Claims**



1. A screen mat having a moulded elastomeric body and an elongated substantially inextendable tensioning member extending through said body along a path remote from the side edges of the body, said member being intended to tension the screen mat in use to restrain flexibility of the body, and in which the body comprises a screen part having an upper screening surface and a lower underside surface which is substantially parallel with said screening surface; said screen part having an apertured portion in which are located an array of apertures which communicate between said surfaces, and said screen part carrying a rib which is integrally moulded therewith and is located on said underside surface of the screen part, and wherein said tensioning member extends through the body substantially parallel with said surfaces and is located in the material of the rib and is substantially parallel therewith, said tensioning member being immediately below the underside surface of the screen part, the underside surface of the screen part being substantially tangential to the peripheral surface of the tensioning member, and the tensioning member is, for its longitudinal extent which passes through the rib, substantially enclosed over its peripheral surface by the material of the rib, said rib being co-extensive with at least said apertured portion of said screen part.

3,970,551

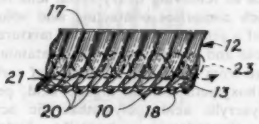
GOLD SEPARATOR

Mynie L. Wright, and Theodore H. Wright, both of 5617 E. Commerce, Spokane, Wash. 99206

Filed Apr. 23, 1975, Ser. No. 570,756

Int. Cl.² B03B *5/26*

U.S. Cl. 209—458 **3 Claims**



1. A gold sluice, comprising:

an upwardly open elongated trough having an elongated open ended water passageway formed therein of generally semicylindrical configuration extending from an open intake end along a longitudinal central axis to an open outlet end within said trough; and

corrugations disposed angularly along said axis in a spiral configuration within the passageway and comprised of ridges and interspersed grooves formed integrally with said trough for imparting longitudinal spiral turbulence to water moving along said passageway and for progressively collecting gold sediment in the grooves from a placer material placed at the intake end.

3,970,552

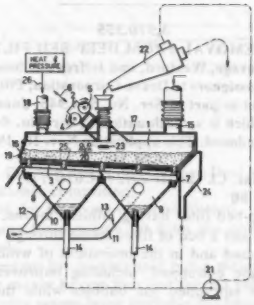
METHOD AND MEANS FOR SEPARATION OF LIQUIDS FROM A MIXTURE OF SOLIDS AND LIQUIDS

Wilhelm Bongert, Bochum, Germany, assignor to Klockner-Humboldt-Deutz Aktiengesellschaft, Germany

Filed Aug. 30, 1974, Ser. No. 501,894

Int. Cl.² B01D *33/00*

U.S. Cl. 210—19 **8 Claims**



1. A method for the separation of liquids from a solid liquid mixture comprising the steps:

depositing a solids liquid mixture on a separating oscillating conveyor surface permeable to the liquid with the material moving in a conveying direction;

applying a vacuum on the undersurface of the separating surface;

and increasing the vacuum in the conveying direction of material movement on the separating surface.

3,970,553

HEAVY METAL ADSORBENT PROCESS

Kazuki Terajima; Shigeru Tomita; Yoshindo Matsuda, all of Tokyo, and Keiji Abe, Ohmiya, all of Japan, assignors to Director-General of the Agency of Industrial Science and Technology, Tokyo, Japan

Division of Ser. No. 400,645, Sept. 25, 1973, Pat. No. 3,900,422. This application Nov. 20, 1974, Ser. No. 525,513
Claims priority, application Japan, Sept. 26, 1972, 45-95762; Oct. 27, 1972, 45-107101
Int. Cl.[2] B01D *15/00*; C02B *1/52*
U.S. Cl. 210—36 6 Claims

1. A process of removing heavy metal ions from aqueous solutions which comprises contacting said solution with a porous mass of a generally homogeneous mixture comprising nitrohumic acid and a carboxyl group-containing polymeric binder selected from the group consisting of carboxymethylcellulose, carboxymethylstarch, alginic acid, pectinic acid, proteins, polyacrylic acid, polymethacrylic acid, partially hydrolyzed polyacrylamide, partially hydrolyzed N-methylolated polyacrylamide or polymethacrylamide and water insoluble salts thereof, said binder being present in the amount of about 5–50 parts by weight per 100 parts of said nitrohumic acid, said mixture being heated to about 120°–200°C for about 0.5–5 hours before being contacted with said solution to insolubilize the same.

3,970,554

PROCESS FOR DETOXIFICATION OF CYANIDES AND NITRILES WITH PEROXYGEN COMPOUNDS

Joachim Fischer, Grossauheim; Helmut Knorre, Seligenstadt, and Gerhard Pohl, Grossauheim, all of Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Germany

Filed Oct. 16, 1974, Ser. No. 515,253
Claims priority, application Germany, Oct. 22, 1973, 2352856
Int. Cl.[2] C02B *1/36*
U.S. Cl. 210—62 15 Claims

1. In a process for the detoxification of waste water containing a member of the group consisting of inorganic cyanides, organic unsubstituted nitriles and organic cyanohydrins by the addition of a peroxygen compound the improvement comprising carrying out the detoxification in the presence of an iodine source selected from the group consisting of iodine, iodide ions and a mixture of iodine and iodide ions.

3,970,555

GAS REMOVAL FROM DEEP-BED FILTERS

Elton Stuart Savage, Wexford, and Jeffrey J. Chen, Pittsburgh, both of Pa., assignors to Dravo Corporation, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 584,945, June 9, 1975, abandoned, which is a continuation of Ser. No. 444,887, Feb. 22, 1974, abandoned. This application Nov. 10, 1975, Ser. No. 630,346
Int. Cl.[2] B01D *23/24*; C02C *11/14*
U.S. Cl. 210—80 13 Claims

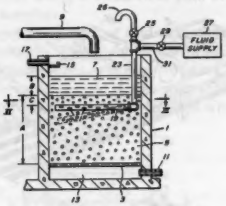
1. In a deep-bed filter having influent means, effluent discharge means and a bed of filter media through which media liquids are passed and in the interstices of which media gas bubbles become entrapped, including improved means for removing said entrapped gas bubbles while the filter is in service, the gas removal means comprising:

an entrapped gas collecting means disposed within the filter bed, and located between the influent means and the effluent discharge means, at a level therein spaced from the influent end of the filter a distance, in the direction of fluid flow, of between about 5 to about 50 percent of the bed depth; and

conduit means connected to the gas collecting means, said conduit means having a discharge end located at a height above the head of liquid passing through the bed to vent the entrapped gas bubbles to the atmosphere.

8. In a wastewater treatment process wherein wastewater is charged through an influent means to the influent end of a deep-bed filter containing a bed of filter media and discharged through an effluent means at the effluent end thereof and wherein gas bubbles become entrapped in the interstices of the filter media, a method of removing said entrapped gas bubbles, while the filter is in operation, comprising:

collecting said gas bubbles in an entrapped gas bubbles collection means disposed within the filter bed, between



the influent means and the effluent means, at a level therein spaced from the influent end of the filter a distance, in the direction of wastewater flow, of between about 5 to about 50 percent of the bed depth; and

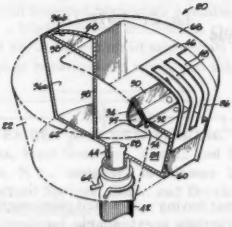
venting said collected gas bubbles to the atmosphere through conduit means connected to the gas collecting means, said conduit means having a discharge end located at a height above the head of liquid passing through the bed.

3,970,556

FLOATING SKIMMER FOR CLEANING THE SURFACE OF A BODY OF LIQUID, METHOD AND APPARATUS

Douglas John Gore, 5168 Brookside Lane, Concord, Calif. 94521

Filed Sept. 23, 1974, Ser. No. 508,446
Int. Cl.[2] B01D *21/00*; E02B *15/04*
U.S. Cl. 210—83 20 Claims



1. A floating skimmer for skimming the surface of a body of liquid surrounding the skimmer while providing a self-compensating positioning of a weir for maintaining efficient skimming flow over the weir during varying conditions of operation, said skimmer comprising,

an outer body having an inner, generally centrally disposed cavity,

first flotation means in the outer body for regulating the level of flotation of the skimmer at rest before start-up of skimming operation,

an opening in one peripheral part of the outer body for admitting a flow of liquid into the central cavity,

drain means associated with the central cavity for draining liquid from the cavity and for conducting the drained liquid effluent away from the cavity during skimming operation,

a movable weir extending across the width of said opening for regulating the quantity and velocity of liquid flow through the opening and into the central cavity,

weir-positioning means for adjusting the height of the weir with respect to the surface of the body of liquid surrounding the skimmer to cause a cascade of liquid in a waterfall off the upper edge of the weir and a skimming of the surface of the liquid by the cascade action,

said weir-positioning means including second flotation means on the underside of the weir for supporting the weir above the level of the liquid in the cavity during skimming operation,

said second flotation means having sufficient excess buoyancy to keep an upper portion of the flotation means and the weir always high enough above the level of the liquid in the central cavity to prevent collapse of the weir and to insure dynamic weir action and a waterfall off the upper edge of the weir during operation of the skimmer,

said outer body having inner wall means which coact with the weir and second flotation means during skimming operation to form an air-filled chamber behind the weir within the cavity and below the surface level of the surrounding liquid body and which air chamber provides a positive buoyancy acting in a direction to lift the outer body upwardly,

said inner wall means also coacting with the outer body to form a ballast chamber having a rear chamber in back of the air-filled chamber, as viewed in the direction of fluid flow through said opening and over the weir, and two side chambers extending along the two sides of the air-filled chamber,

said weir-positioning means including ballast in the ballast chamber, a portion of which ballast is raised above the surface level of the surrounding liquid body by the positive buoyance of said air chamber,

the amount and location of the raised ballast being so located with respect to the air chamber as to provide a negative buoyancy vertically balancing the positive buoyancy of the air chamber, and wherein the rear chamber contains an amount of ballast behind the air chamber sufficient to counter balance the amount of liquid within the skimmer in front of the weir and above the level of the liquid in the air chamber to maintain front-to-back equilibrium and to prevent front-to-back tilting of the skimmer, whereby the amount and location of the ballast coacts with the second flotation means to provide a self-compensating position of the weir for maintaining efficient skimming flow over the weir during varying conditions of operation of the skimmer, such as variations in the amount of effluent leaving the drain means and agitation of the surface of the surrounding liquid body.

3,970,557

IMPINGEMENT BAFFLE EQUIPPED OIL FILTER

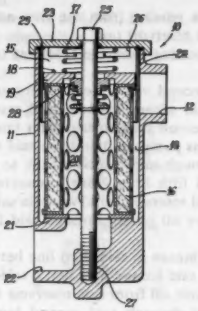
Stephen G. Shoup, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Continuation of Ser. No. 428,390, Dec. 26, 1973, abandoned. This application Feb. 13, 1975, Ser. No. 549,672

Int. Cl.² B01D *27/10*

U.S. Cl. 210—130 **5 Claims**

1. A filter assembly having a housing, a fluid inlet and a fluid outlet in said housing, filter element means disposed within said housing for filtering fluid passing from said inlet to said outlet, impingement baffle means disposed within said housing directly across from said fluid inlet and in the direct path of said fluid entering said housing through said inlet for shielding said filter element from direct impingement of said fluid entering said housing, said baffle means include a rigid cylindrical member, said rigid cylindrical member has notch means therein remote from said inlet for passage of fluid from the exterior to the interior of said cylindrical member by passage through said cylindrical member, separate removable cover means for said housing, said separate cover means not being a part of said housing and not containing said fluid inlet and fluid outlet, said impingement baffle means being integral with



and removable with said cover means, said cover means including an annular cover member and bolt means for fastening said annular cover member to said housing.

3,970,558

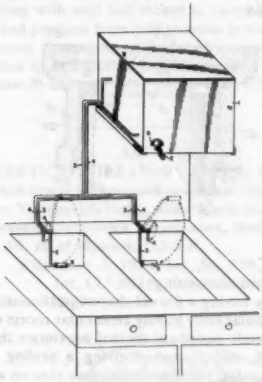
FRYING GREASE RECLAIMER

Kai Sing Lee, 1912 Edgemont St., San Diego, Calif. 92102

Filed Feb. 21, 1974, Ser. No. 444,641

Int. Cl.² B01J *29/36*

U.S. Cl. 210—138 **5 Claims**



1. A fluid filtering device for filtering fluid type oil or the like in a container comprising:

a filter tank for receiving oil to be filtered,

pump means for pumping oil from the container to said filter tank,

reservoir means for priming said pump means,

said pump means having first and second valve means,

said first valve means being operable to channel oil through said pump means to the reservoir means and through said reservoir means to said filter tank,

said second valve means being operable to pass oil from said filter tank to the container,

means in the filter tank for filtering the oil passing therethrough,

a second tank positioned above said pump means,

a first oil line passing from the container to said second tank and a second oil line passing from said second tank to said first and second valve means,

said reservoir means comprising a reservoir tank positioned above said second tank means,

a third oil line passing from said reservoir tank to said second tank,

a fourth oil line passing from the first and second valve means to said reservoir tank,

a fifth oil line passing from the reservoir tank to the filter tank,

said first and second valve means being operable to pass fluid from said second tank to said reservoir tank and from said reservoir tank to said filter tank,

said pump means pumping fluid from said second tank and container through said reservoir tank to said filter tank,

said fourth and fifth lines being connected to the upper portion of said reservoir tank, wherein said reservoir tank is filled before oil passes through said fifth line to said filter tank,

and third valve means in said third line between said reservoir tank and said second tank that is selectively openable to pass reservoir oil from said reservoir tank to said second tank and through said second tank to said valve means and pump means providing priming oil to said pump means.

3,970,559

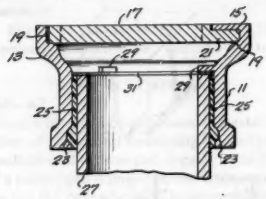
DRAIN GUARD

Thomas Cannon; Frances G. H. Cannon, both of 3557 Hamlet Place, Chevy Chase, Md. 20015; Jane E. H. Cowan, 10277 Gainsborough Road, Potomac, Md. 20854, and Bernard McCarthy, 8918 Simpson Lane, Clinton, Md. 20735

Filed Dec. 19, 1974, Ser. No. 534,586

Int. Cl.² E03F *1/00*

U.S. Cl. 210—166 **8 Claims**



1. A drain guard comprising:

a tubular body having a funnel-shaped portion at its upper end, said tubular body having an annular recess extending about the inside periphery thereof proximate the bottom end thereof, said recess receiving a sealing grommet therein for sealing the space between a pipe on which said guard is positioned and the inner periphery of said tubular portion of said guard,

means for limiting the upward movement of said pipe in said guard and a fluid permeable seat positioned on said funnel end portion of said drain, said means for limiting the upward movement of said pipe in said guard comprises a plurality of limiting members integrally formed with said guard and extending inwardly from the inner periphery thereof at the junction of the tubular and funnel portions thereof.

3,970,560

PARTS WASHER

Herman U. Metzger, R.R. No. 4, Box 18, Goshen, Ind. 46526

Filed Sept. 20, 1974, Ser. No. 507,941

Int. Cl.² B01D *33/40*

U.S. Cl. 210—167 **8 Claims**

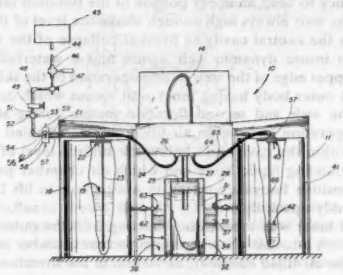
1. Parts washing apparatus comprising:

a sealed first container, for washing fluid, having a washing fluid outlet;

a sealed second container for washing fluid having a washing fluid outlet;

means to selectively provide simultaneous air pressure within said first container and a vent to atmosphere of said second container and simultaneous air pressure within said second container and a vent to atmosphere of said first container;

first conduit means constructed and arranged to deliver fluid from the outlet of the first container to a parts washing area comprising a sink with a drain when the pressure inside the first container is increased;



a filter apparatus for the washing fluid having an inlet end coupled to the sink drain and having an outlet end;

second conduit means coupling fluid from the filter apparatus outlet end to the second container;

third conduit means constructed and arranged to deliver fluid from the outlet of the second container to the parts washing area when the pressure inside the second container is increased; and

fourth conduit means coupling fluid from the filter apparatus outlet end to the first container.

3,970,561

SEPARATION OF COMPOUNDS DIFFERING IN ISOTOPIC COMPOSITION

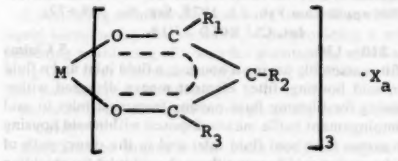
Robert E. Sievers, 2628 N. Emerald Drive, Fairborn, Ohio 45324, and Joseph J. Brooks, 1631 Beaver Ridge Drive, Kettering, Ohio 45429

Division of Ser. No. 476,179, June 4, 1974, Pat. No. 3,891,413. This application Mar. 11, 1975, Ser. No. 557,568

Int. Cl.² B01V *15/08*

U.S. Cl. 210—198 C **17 Claims**

1. A composition consisting essentially of a particulate support material and a solution of a lanthanide chelate coated thereon, the lanthanide chelate having the following structural formula:



wherein M is a rare earth element of the lanthanide series; R_1, R_2 and R_3 are individually selected from the group consisting of hydrogen, deuterium, alkyl and fluoroalkyl; R_1 and R_2 together are d-camphor and R_3 is fluoroalkyl; X is water or an organic compound containing a donor group; and *a* is a numeral from zero to 4, inclusive.

3,970,562

AGGREGATION TREATMENT APPARATUS FOR WASTE WATER

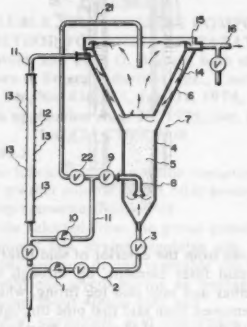
Saburo Motozawa; Hiroyoshi Itoga; Hirobumi Wada, and Hiromasa Marukawa, all of Tokyo, Japan, assignors to Tokyo Denki Kagaku Kogyo Kabushiki Kaisha (TDK Electronics Co., Ltd.), Tokyo, Japan

Filed Dec. 30, 1974, Ser. No. 537,367

Claims priority, application Japan, Jan. 11, 1974, 49-6063

Int. Cl.² B01D *21/26*; C02B *1/10*

U.S. Cl. 210—205 7 Claims



1. In a continuous apparatus for aggregating suspended colloidal solids in waste water comprising a suspending stage in which metallic particles of metal, metal oxide or sintered metal oxide carrying an electrical charge opposite to that on said solids are suspended in a feed flow of said waste water; an electrical aggregating stage in which said feed flow with said particles suspended therein is passed between oppositely charged electrodes to flocculate said oppositely charged particles and colloidal solids; and a separating stage in which the metallic particles are separated from said flocculent-containing water flow; the improvement wherein said suspending and separating stages are formed as an integral unit having an inverted conical upper section with means for introducing the flocculent containing flow from said aggregating stage in a tangential direction adjacent the upper end thereof to centrifugally collect flocculated matter and separate said metallic particles therefrom, and means for removing the collected flocculated matter and effluent water from an interior point within said conical section; and a tubular section extending downwardly from the lower end of said conical section to receive the separated metallic particles therefrom with means for introducing said waste water feed flow into said tubular section to resuspend said separated particles in said feed flow; and said electrical aggregating section comprises an elongated chamber separate from said integral unit, said chamber having a plurality of oppositely charged electrode pairs arranged at intervals along the interior walls thereof, said electrodes being formed of insoluble electrically conductive material, conduit means for delivering said particle-containing feed flow from said tubular section to one end of said elongated chamber and conduit means for delivering the flocculent containing water flow from the opposite end of said elongated chamber to said introducing means for said inverted conical section.

3,970,563

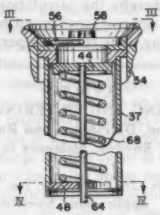
FILTER AND BYPASS VALVE ARRANGEMENT

Edward A. Codo, Joliet, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Division of Ser. No. 334,090, Feb. 20, 1973, Pat. No. 3,883,430. This application Jan. 15, 1975, Ser. No. 541,327

Int. Cl.² B01D *35/16*; F16K *51/00*

U.S. Cl. 210—237 2 Claims



1. In a fluid supply system, a readily removable valve assembly comprising:

a housing member, said housing member having a pair of recesses therein, valve means mounted within and removable from said housing member, bail means attached to said valve means and movable between a first position out of the fluid flow path and a second position, said bail means having two end portions each of which being constructed and arranged for engagement with one of said recesses, lug means associated with said valve means for coacting with said bail means to cause the retraction of said end portions from said recesses in said housing member upon movement of said bail means from said first position to said second position to allow removal of said bail means and said valve means from said housing member.

3,970,564

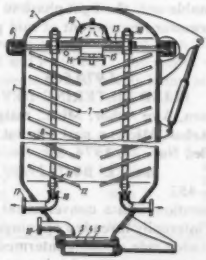
VERTICAL VIBRATORY LIQUID FILTER

Ural Gilyazitdinovich Shamsutdinov, ulitsa Obraztsova, 8a, kv. 99; Jury Viktorovich Gutin, ulitsa Karla Marxa, 20, kv. 38, and Alexandr Sergeevich Kupriyanov, Dmitrovskoe shosse, 45, kv. 65, all of Moscow, U.S.S.R.

Filed Dec. 3, 1974, Ser. No. 529,114

Int. Cl.² B01D *29/04*, *35/20*

U.S. Cl. 210—323 R 6 Claims



1. A vertical vibratory liquid filter comprising a vertical shell; a feed manifold for feeding the suspension to be filtered into said shell; a cake-discharge hole located in the lower part of said shell; at least one upright drain pipe inside said shell, said drain pipe remaining upright inside said shell at all times; a filtrate-discharge manifold communicating with said drain pipe; filter elements secured on said drain pipe and accommodating spaces which communicate with said pipe, said filter

elements being situated one above the other and spaced from each other along said pipe; said filter elements respectively having upper filtering surfaces inclined downwardly towards said discharge hole and having lower edges arranged above said discharge hole and situated on one side of said pipe while having opposite upper edges situated on the other side of said pipe; and a vibrator operatively connected with said filter elements for setting said filter elements in vibration for the removal of cake, whereby the orientation of said drain pipe and filter elements remains unchanged both during filtering operations and during cake-removal operations.

3,970,565

SEPARATING AND FILTERING DEVICE

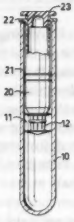
Bengt Erik Ahlstrand, Djursholm, and Rune Henry Carlsson, Sjuntorp, both of Sweden, assignors to Aktiebolaget Stille-Werner, Sweden

Filed Nov. 26, 1974, Ser. No. 527,374

Claims priority, application Sweden, Nov. 27, 1973, 7316030

Int. Cl.² B01D *33/00*

U.S. Cl. 210—359 **7 Claims**



1. A separating and filtering device for effecting sealed separation of a fluid, such as blood, into a light phase and a heavy phase, comprising:

a. a tubular container for receiving a sample of the fluid having both phases;

b. a cup-shaped hollow piston disposed in said container and having a closed bottom and a radially permeable side wall; and

c. a first and a second circumferential sealing lip extending radially from said piston and axially spaced apart by said permeable side wall, said lips normally sealingly engaging the inner surface of said tubular container, said first lip being adjacent to said closed bottom and being deflectable to enable only the light phase to pass by in response to any downward movement of said piston.

3,970,566

FLUID FILTERING DEVICE

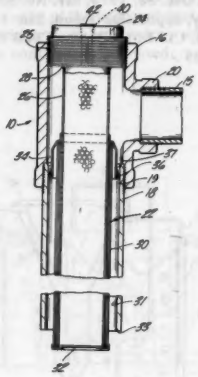
Borje O. Rosaen, Ann Arbor, Mich., assignor to Dale P. Fosdick, Ann Arbor, Mich., a part interest

Filed Nov. 20, 1974, Ser. No. 525,739

Int. Cl.² B01D *27/00*

U.S. Cl. 210—452 **3 Claims**

1. In combination with a conventional tee fitting, said tee fitting having internally threaded openings at each end and an internally threaded side opening intermediate said end openings, a first conventional pipe having an externally threaded end received by one of said end openings, a second conventional pipe having an externally threaded end received by said side opening, a filter device to be mounted in said conventional tee fitting comprising a cap member adapted to be mounted to the free end opening of said tee fitting, a perforated, tubular member secured at one end to said cap member so that said tubular member extends axially through said tee fitting, and across said side opening so that the free end of said tubular member is positioned on the opposite transverse side of said side opening from the cap member, a hollow filter element secured to the free end of said perforated tubular member below said side opening wherein said filter element is in axial alignment with said tubular member so that said filter element extends axially into said first pipe and wherein said filter element is spaced radially inward from said first pipe, so



that fluid flows from the exterior of said filter element to the interior of said filter element, up through said perforated tubular member and into said tee fitting, whereby said filter element is removed from said first pipe through said tee fitting in unison with the removal of said cap member and said perforated, tubular member.

3,970,567

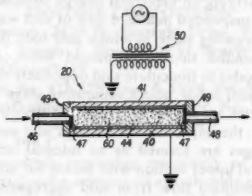
OZONIZER WITH ABSORPTION OF OZONE

Frank Eugene Lowther, Severna Park, Md., assignor to W. R. Grace & Co., Columbia, Md.

Filed Apr. 17, 1975, Ser. No. 568,934

Int. Cl.² C01B *13/11*

U.S. Cl. 250—533 **6 Claims**



1. An ozone generator comprising a plurality of spaced-apart metallic electrodes and at least one thin dielectric layer between the electrodes thereby defining a corona chamber;

electrical means for imposing a silent discharge potential in the corona chamber;

supply means for passing an oxygen-containing gas through the corona chamber;

a bed of silica gel adsorbent and means for maintaining said bed of silica gel adsorbent particles in the corona chamber for adsorbing ozone generated therein; and

means for desorbing the ozone from the silica gel.

6. In an ozone generator having at least one dielectric layer between spaced-apart electrodes and having a corona chamber, the improvement which comprises: dielectric solid adsorbent particles disposed in the corona chamber for selectively adsorbing ozone.

3,970,568

ALIPHATIC SULFURIZED ESTER LUBRICANT

Bruce W. Hotten, Orinda, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Continuation-in-part of Ser. No. 500,235, Sept. 5, 1974, abandoned. This application July 3, 1975, Ser. No. 592,934
Int. Cl.² C10M 1/38, 3/32, 5/28, 7/36
U.S. Cl. 252—48.6 9 Claims

1. A lubricating oil composition comprising:

A. a major amount of an oil of lubricating viscosity, and

B. an amount effective to impart extreme-pressure and/or antiwear lubricating properties to said oil of an aliphatic sulfurized ester of an olefinic mono- or dicarboxylic acid which does not contain any allylic hydrogen atoms.

3,970,569

WATER SOLUBLE TRIGLYCERIDE COMPOSITIONS AND METHOD FOR THEIR PREPARATION

Robert J. Sturwold, and Fred O. Barrett, both of Cincinnati, Ohio, assignors to Emery Industries, Inc., Cincinnati, Ohio Division of Ser. No. 438,283, Jan. 31, 1974, Pat. No. 3,928,401. This application Aug. 28, 1975, Ser. No. 608,764
Int. Cl.² C10M 1/06
U.S. Cl. 252—49.3 4 Claims

1. An aqueous lubricating composition comprising an aqueous solution of a water soluble mixed ester product obtained by the single-step transesterification of:

a. a triglyceride selected from the group consisting of animal oils, animal fats, drying vegetable oils, semi-drying vegetable oils and non-drying vegetable oils;

b. a polyoxyethylene glycol having an average molecular weight of from about 400 to 800; and

c. a hydrocarbyl carboxylic acid containing one or two carboxyl groups and from 2 to 12 carbon atoms; said reactants (a), (b) and (c) respectively comprising 5 to 35%, 60 to 85% and 1 to 20by weight of the total charge, said solution being clear at room temperature but having a distinct cloud point above 95°F.

3,970,570

ANTIWEAR ADDITIVE MIXTURE

Robert Eugene Pratt, San Marino, and John Habzansky, North Hollywood, both of Calif., assignors to Bray Oil Company, Los Angeles, Calif.

Filed Dec. 8, 1975, Ser. No. 638,468
Int. Cl.² C10M 1/10, 3/02, 5/02, 7/02
U.S. Cl. 252—49.9 6 Claims

1. An ashless lubricating composition with good oxidation stability above 300°F., said composition comprising a base oil of lubricating viscosity containing as an antiwear additive combination a mixture of from about 0.25 to 3% tricresyl phosphate and from about 0.25 to 2% pentaerythritol monooleate.

3,970,571

METHOD FOR PRODUCING IMPROVED ELECTROGRAPHIC DEVELOPER

James R. Olson, Rochester, and Robert C. Storey, Penfield, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 20, 1974, Ser. No. 535,001
Int. Cl.² G03G 9/10
U.S. Cl. 252—62.1 P 12 Claims

1. A method for preconditioning a dry electrographic developer incorporating free toner particles prior to using such developer to develop images in an electrographic process, said method comprising the steps of:

a. intimately mixing together

i. an unconsolidated mass of carrier particles, and

ii. an unconsolidated mass of resin-based toner particles containing charge control agent in greater concentration than desired in free toner particles of the developer after preconditioning and for developing images in an electrographic process,

to form a resulting mixture which includes at least some free toner particles but in a concentration which is less than desired in the developer after preconditioning and for developing images in an electrographic process, such mixing being for a sufficient length of time and in such a way as to pack any pores of said carrier particles with toner particles, to scum the surfaces of said carrier particles with charge control agent, and to abrade the surfaces of said carrier particles; and

b. introducing into and intimately mixing with said resulting mixture an additional quantity of resin-based toner particles containing charge control agent to increase the concentration of free toner particles up to that desired in the developer after preconditioning and up to that desired for developing images in an electrographic process, the concentration of charge control agent in the additional quantity of toner particles being about the same as desired in the free toner particles of the developer after preconditioning and about the same as desired for developing images in an electrographic process; the total concentration of toner particles in the developer after preconditioning being in the range of about 1 to about 10% based on the weight of the carrier particles and the total amount of charge agent in the toner particles after preconditioning the developer being in the range of about 0.1 to about 6.0% based on the weight of the resin in the toner particles.

3,970,572

FERROELECTRIC CERAMIC COMPOSITION

Toshio Ogawa; Mutsuo Munekata; Kenji Ozawa, and Kiichi Minai, all of Nagaokakyo, Japan, assignors to Murata Manufacturing Co., Ltd., Japan

Filed Dec. 12, 1974, Ser. No. 532,160
Claims priority, application Japan, Dec. 12, 1973, 48-140994; Oct. 1, 1974, 49-113584
Int. Cl.² C04B 35/46, 35/48
U.S. Cl. 252—62.9 5 Claims

1. A ferroelectric ceramic composition of the ternary system $Pb(Sn_{\alpha}Sb_{1-\alpha})O_3$—$PbTiO_3$—$PbZrO_3$ comprising a solid solution represented by the general formula:

$$xPb(Sn_{\alpha}Sb_{1-\alpha}O_3)\text{-}yPbTiO_3\text{-}zPbZrO_3$$

wherein

$x + y + z = 1.00$ and

$\frac{1}{2} \leq \alpha \leq \frac{3}{4}$,

said composition being in a polygonal area defined by the points A, B, C, D, E and F in FIG. 1, the sets of mole fractions of the three components at said points being as follows:

	x	y	z
	0.01	0.60	0.39
	0.01	0.30	0.69
	0.15	0.25	0.60
	0.25	0.25	0.50
	0.25	0.50	0.25
	0.15	0.60	0.25

5. A ferroelectric ceramic composition of the ternary system $Pb(Sn_{\alpha}Sb_{1-\alpha})O_3$—$PbTiO_3$—$PbZrO_3$ comprising a solid solution represented by the general formula:

$$xPb(Sn\ Sb\ O_3)\text{—}yPbTiO_3\text{—}zPbZrO_3$$

wherein $x + y + z = 1.00$, said composition being in a polygonal area defined by the points A, B, C, D_2, E_2 and F in FIG. 1, the sets of mole fractions of the three components at said points being as follows:

x	y	z
0.01	0.60	0.39
0.01	0.30	0.69
0.15	0.25	0.60
0.15	0.35	0.50
0.15	0.50	0.35
0.15	0.60	0.25

3,970,573

ELECTROVISCOUS FLUIDS

James W. Westhaver, Box No. 2, Mount Holly, Va. 22524

Filed Aug. 25, 1975, Ser. No. 607,217
Int. Cl.² C09K *3/00*
U.S. Cl. 252—73 5 Claims

1. An electroviscous fluid consisting of a dielectric oil of relatively low viscosity and particles composed essentially of starch dispersed in said oil to a volume concentration of from 40 to 60 percent, said particles including an electrolyte in amount from 1 to 10 weight percent and including water in amount from 1 to 5 weight percent.

3,970,574

HYDRAULIC BRAKE FLUID COMPOSITION

Edmund Luke Niedzielski, Wilmington, Del., assignor to E. I. Du Pont De Nemours & Co., Wilmington, Del.

Filed June 16, 1975, Ser. No. 587,226
Int. Cl.² C10M *3/20*; C09K *3/00*
U.S. Cl. 252—79 7 Claims

1. A hydraulic fluid consisting essentially of a random equilibrium mixture of triethylene glycol diesters of acetic acid and propionic acid wherein the molar ratio of acetyl groups to propionyl groups in the diester mixture is from about 40:60 to about 50:50.

5. A process for preparing a hydraulic fluid, the process comprising reacting triethylene glycol and a mixture of acetic acid and propionic acid in the presence of an acid catalyst and removing the water of condensation, the amount of acid mixture used being in the range of the stoichiometric amount needed to completely esterify the glycol to a 10 percent excess of that amount, and the molar ratio of acetic acid to propionic acid being from about 40:60 to about 50:50.

3,970,575

LIQUID PEROXYGEN BLEACH

John H. Barrett, Jr., La Mirada, Calif., assignor to Purex Corporation, Lakewood, Calif.

Filed Feb. 21, 1974, Ser. No. 444,466
Int. Cl.² C11D *3/40*, *7/54*
U.S. Cl. 252—95 9 Claims

1. An acidic stabilized aqueous bleach product consisting essentially of about:

a. 1.0 to 8.0 percent by weight stabilized hydrogen peroxide;

b. 0.5 to 10 percent by weight of a water soluble non-ionic surfactant which is a polyethylene oxide condensate having an HLB value from about 10 to 15, said condensate being of polyethylene oxide and a member from the group consisting of alkyl phenols having alkyl groups of 6 to 12 carbon atoms, secondary alcohols having from 8 to 22 carbons, linear primary alcohols having from 8 to 22 carbon atoms, polyoxypropylene glycols having molecular weights of at least 900, fatty alcohols having from 8 to 22 carbons, and fatty acid partial esters of polyhydric alcohols having at least 4 moles of polyoxyethylene and derived from fatty acids having from 8 to 28 carbons; and

c. 0.0002 to 0.002 percent by weight color stable phthalocyanine blue dye pigment powder, said product having a clear blue appearance.

3,970,576

BACTERIOSTATIC TOILET BOWL CLEANER COMPOSITIONS

Robert Carmello, Dumont; Barry A. Salka, Clifton, and Garland G. Corey, Milltown, all of N.J., assignors to American Home Products Corporation, New York, N.Y.

Division of Ser. No. 312,767, Dec. 6, 1972, Pat. No. 3,897,357.
This application Mar. 21, 1975, Ser. No. 560,898
Int. Cl.² C11D *1/72*, *3/48*
U.S. Cl. 252—106 6 Claims

1. An anti-bacterial solid composition consisting essentially of:

Component	% By Weight
5-Chloro-2-(2,4 dichlorophenoxy)phenol	1–3
Ethoxylated alcohol adduct	20–90
Alkoxylated primary fatty alcohol	0.1–10
Polyethylene glycol	0.1–10
Sodium sulfate, perfume, dye	Sufficient to make up to 100%

wherein 5-chloro-2-(2,4-dichlorophenoxy)phenol is present at a use dilution of about 0.1 parts per million to less than 1.0 parts per million, wherein the alkyl chain length of the alkoxylated primary alcohol is from about 12 carbon atoms to 15 carbon atoms and the alkyl chain length of the ethoxylated alcohol adduct is from 16 carbon atoms to about 20 carbon atoms.

6. A method for preventing the growth or multiplication of *S. aureus*, *P. mirabilis* and *E. coli* in toilet bowls which comprises dispensing the composition of claim 1 into the water of a toilet to prevent such growth.

3,970,577

WATER-DISPERSIBLE ALUMINIUM PASTES

Wolfgang Glück, and Lothar Benek, both of Haus, Germany, assignors to Messrs. Eckart-Werke Standard-Bronzepulver-Werke Carl Eckart, Fuerth, Bayern, Germany

Filed Jan. 13, 1975, Ser. No. 540,608
Claims priority, application Germany, Jan. 17, 1974, 2402073
Int. Cl.² C09K *3/00*
U.S. Cl. 252—182 8 Claims

1. A method for producing a dispersion of aluminium particles in water which comprises preparing an aluminium containing paste by grinding aluminum into finely divided particles in the presence of a hydrophilic polymer dispersed in a water-immiscible inert organic liquid, mixing the paste with water and separating the phase of the water-immiscible organic liquid.

3,970,578

ADDITIVE COMPOSITION FOR TEXTILE BLEACHING BATHS

Bernard J. Datlow, Elizabeth, N.J., assignor to Bernard J. Datlow, Elizabeth, N.J.

Filed Apr. 15, 1974, Ser. No. 460,777
Int. Cl.² D06L *3/12*, *3/08*, *3/02*
U.S. Cl. 252—186 4 Claims

1. An aqueous additive composition for textile bleaching baths wherein the relative amounts of ingredients of said additive constituent comprises from 85.0% to 90.0% sodium zinc hexametaphosphate, 1.0% to 1.4% zinc borate and 8.3% to 14.0% urea, all by weight.

3,970,579
LOW MELTING LIQUID-CRYSTAL MIXTURES

Lynn J. Taylor, Haslett, Mich., assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Aug. 2, 1971, Ser. No. 168,447
Int. Cl.² C09K *3/34*; G02F *1/13*
U.S. Cl. 252—299 **22 Claims**

1. A process for preparing in situ a mixture of at least two liquid-crystal compounds which comprises the steps of

a. forming a mixture of at least two monofunctional reactants having the same functional group and at least one difunctional reactant having functional groups suitably reactive with the common reactive group of the first two monofunctional reactants, and

b. reacting said reactants in situ to form a product mixture having liquid-crystal properties and comprising a mixture of at least two components.

3,970,580
METHOD OF MAKING SPHERICAL METALLIC OXIDE AND METALLIC CARBIDE PARTICLES

Erich Zimmer, Julich, Germany, assignor to Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung, Julich, Germany

Filed May 7, 1974, Ser. No. 467,728
Claims priority, application Germany, May 8, 1973, 2323010
Int. Cl.² C09K *3/00*
U.S. Cl. 252—301.1 S **2 Claims**

1. A method of making spherical metallic oxide and metallic carbide particles of fuels and breeding material for nuclear reactors, such as oxide or carbide compounds which have a diameter of from 0.1 to 1.5 millimeters, which includes in combination the steps of: dropwise adding to an organic phase above an aqueous solution of ammonia a substance selected from the group consisting of an aqueous solution of a metallic nitrate, a metallic chloride, a mixture of metallic nitrates, a mixture of metallic chlorides or a sol containing said metal oxides, the molarity of said metallic ions being between 0.4 and 1.5, and said carbides being formed by adding carbon in colloidal form to said aqueous solution or sol and then sintering the carbon containing oxide particles, while employing as organic phase a substance selected from the group consisting of a ketone or a ketone mixture which at room temperature has a solubility for water up to about 4% by weight and has a viscosity between one half and twice that of water, washing the drops formed from said aqueous solution after they have congealed in an aqueous solution containing ammonia and from 0.001% to 0.1% of a non-ionic surface active agent, such as an ethylene oxide condensate which envelops said particles and prevents them from clumping during the drying step, drying the particles in an air current having a temperature of from 150° to 300°C and an atmospheric moisture content corresponding to the degree of saturation of the air at a temperature of about from 20° to 50°C, and sintering the thus dried particles at about 1300°C.

3,970,581
MULTIPLE GAS STREAMS IN THE POST OXIDATION STEP IN A PROCESS FOR CONVERTING URANIUM HEXAFLUORIDE TO URANIUM OXIDE RICH COMPOSITIONS

Donald Wayne Jeter, and Walter Gill Keith, both of San Jose, Calif., assignors to General Electric Company, San Jose, Calif.

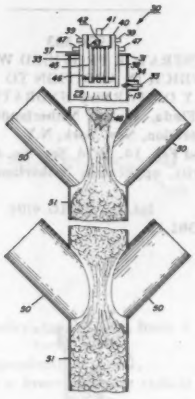
Filed May 12, 1975, Ser. No. 576,699
Int. Cl.² C01G *43/02*
U.S. Cl. 252—301.1 R **28 Claims**

1. A method of preparing a uranium oxide rich composition from uranium hexafluoride in a reaction zone in the presence of an active flame having the steps of:

a. introducing a first gaseous reactant comprising a mixture of uranium hexafluoride and an oxygen-containing gas into the reaction zone,

b. introducing a second gaseous reactant comprising a reducing gas into the reaction zone,

c. separately introducing a shielding gas in the reaction zone between the first gaseous reactant and the second gaseous reactant which temporarily prevents substantially mixing and reaction between the first and second gaseous reactants until sufficient cross diffusion of the reactants occurs as the reactants pass through the reaction zone resulting in a reaction producing a particulate uranium



dioxide rich composition and gaseous reaction products, and

d. introducing a third gaseous reactant comprising an oxygen-containing gas into contact with the particulate uranium dioxide rich composition and the gaseous reaction products in the form of multiple streams thereby converting the residual reducing gas in the reaction zone to an oxidized form and oxidizing the uranium dioxide rich composition to a higher oxide of uranium, with at least one of the multiple streams being positioned downstream from the other so that the heat of reaction is dispersed in the reaction zone.

3,970,582
ALPHA BARIUM ZINC CADMIUM SULFIDE PHOSPHORS AND METHOD

Albert K. Fan, Hackettstown, and Melvin Tecotzky, Mendham, both of N.J., assignors to United States Radium Corporation, Morristown, N.J.

Continuation-in-part of Ser. No. 448,621, March 6, 1974, abandoned. This application Dec. 4, 1975, Ser. No. 637,840
Int. Cl.² C09K *11/46*
U.S. Cl. 252—301.6 S **9 Claims**

1. A phosphor having an alpha crystal structure isostructural with Ba_2MnS_3 and the chemical composition

$$Ba_zZn_{1-y}Cd_yS_3 : A_w \cdot zZnS$$

wherein A is an activator element selected from the group consisting of manganese, europium, cerium, lead and terbium, y is a numerical value in the range from 0 to 1, z is a numerical value in the range from 0 to 20, and w is a numerical value in the range from 0.00001 to 0.1.

8. The method of making an alpha crystal structure phosphor composition that is isostructural with Ba_2MnS_3 which comprises preparing a mixture of a host compound comprising

alpha $Ba_2Zn_{1-y}Cd_yS_3$,

wherein y is a numerical value from 0 to 1, and an activator compound selected from the class consisting of carbonates, oxides, nitrates, sulfates, acetates, halides and sulfides of an activator element selected from the class consisting of manganese, europium, cerium, lead and terbium, in proportions of one atom part host compound to an amount of activator compound containing from 0.00001 to 0.1 atom part activator element, heating such mixture in a non-oxidizing atmosphere at a temperature in the range from 600° to 1000°C. for a time between 0.5 and 30 hours, and then cooling the product to room temperature.

3,970,583

ISOTOPE GENERATOR PROVIDED WITH A CARRIER MATERIAL WHICH IN ADDITION TO AL_2O_3 CONTAINS FULLY OR PARTLY HYDRATED MNO_2

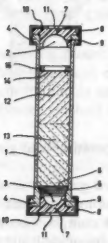
Helena Panek-Finda, Weesp, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Feb. 14, 1974, Ser. No. 442,473

Claims priority, application Netherlands, Feb. 20, 1973, 7302304

Int. Cl.² G21G *4/04*

U.S. Cl. 252—301.15 **8 Claims**



1. In an isotope generator for the production of liquids containing 99 mTc which generator is provided with a reservoir having an inlet opening and an outlet opening and a parent isotope 99 mMo in the form of a molybdate on a carrier material located in said reservoir the improvement wherein the carrier material contains Al_2O_3 and at least partially hydrated manganese dioxide.

3,970,584

AEROSOL PACKAGE CONTAINING A FOAM-FORMING EMULSION AND PROPELLENT SYSTEM

John W. Hart, and Thomas C. Rolfson, both of Racine, Wis., assignors to S. C. Johnson & Son, Inc., Racine, Wis.

Filed Feb. 14, 1973, Ser. No. 332,534

Int. Cl.² C09K *3/30*

U.S. Cl. 252—305 **5 Claims**

1. An aerosol package containing a foam-forming, oil-in-water emulsion and a propellant system consisting essentially of nitrous oxide and isobutane, the weight ratio of nitrous oxide to isobutane being from about 2:1 to about 1:1.5.

3. A propellant system for use in an aerosol package containing a foam-forming, oil-in-water emulsion, said propellant system consisting essentially of nitrous oxide and isobutane, the weight ratio of nitrous oxide to isobutane being from about 2:1 to about 1:1.5.

3,970,585

PROCESS FOR PREPARING OIL-CONTAINING MICROCAPSULES

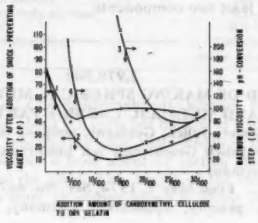
Hiroharu Matsukawa; Shizuo Katayama, and Masataka Kiritani, all of Fujimiya, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Continuation-in-part of Ser. No. 295,329, Oct. 5, 1972, abandoned, which is a continuation of Ser. No. 43,868, June 5, 1970, abandoned. This application Apr. 24, 1973, Ser. No. 354,050

Claims priority, application Japan, June 5, 1969, 44-43597

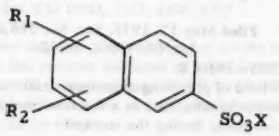
Int. Cl.² B01J *13/02*

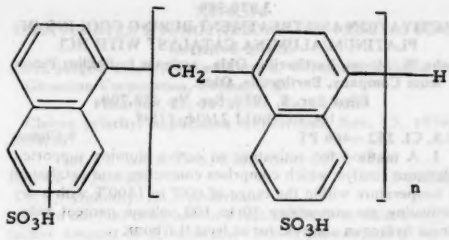
U.S. Cl. 252—316 **7 Claims**



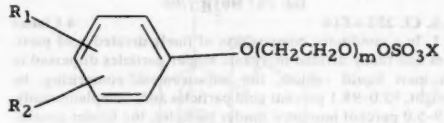
1. In a process for preparing oil-containing microcapsules comprising:

1. cooling a coacervate dispersion comprising a complex gelatin-containing colloid deposited around individual oil droples to cause gelation of the colloid;
2. thereafter adding to the dispersion an aqueous solution of a shock-preventing agent comprising an anionic high molecular weight electrolyte; and
3. subsequently hardening the gelled colloid by adding to the dispersion a hardening agent and adjusting the pH toward the alkaline region to promote hardening; the improvement comprising adding to the dispersion, after said step (1) and prior to said step (3), a combination of said aqueous solution of said shock-preventing agent consisting essentially of an anionic high molecular weight electrolyte selected from the group consisting of a sodium salt of a sulfuric acid ester of cellulose, a sodium salt of a phosphoric acid ester of cellulose; a sodium salt of a carboxymethyl ether of starch; a sodium salt of a carboxymethyl ether of hydroxy ethyl cellulose; a sulfuric acid ester of hydroxyethyl cellulose; a phosphoric acid ester of hydroxyethyl cellulose; pectin; pectic acid; a potassium salt of a copolymer of vinylbenzene sulfonate and acryloylmorpholine; and a sodium salt of a copolymer of acrylic acid and acryloylmorpholine, and an aqueous solution of an anionic surface active agent selected from the group consisting of:

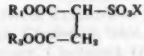




$R(CH_2CH_2O)_mSO_3X$



and



wherein R_1 and R_3 are selected from the group consisting of a hydrogen atom and an alkyl group having from 1 to 18 carbon atoms; wherein R_2 is selected from the group consisting of a hydrogen atom, an alkyl group having from 1 to 18 carbon atoms, and an alkoxy group having from 1 to 18 carbon atoms; where R is selected from the group consisting of an alkyl group having from 1 to 18 carbon atoms, an aryl group and an alkoxy group having from 1 to 18 carbon atoms, wherein X is selected from the group consisting of a hydrogen atom and an alkali metal atom; wherein *n* is an integer ranging from 1 to 9; and wherein *m* is an integer ranging from 5 to 25, said anionic surface active agent and said anionic high molecular weight electrolyte being different substances, and said electrolyte being used in an amount of at least one-twentieth and said anionic surface active agent being used in an amount of one-fiftieth to one-fifth of the amount by weight of the gelatin of the complex colloid.

3,970,586

PERFLUOROALKANE SULFONAMIDO-ALKANE PHOSPHONIC AND PHOSPHONIC ACID DERIVATIVES

Reinhard Schliebs, Cologne; Manfred Wechsberg, Opladen, and Johann Nikolaus Meussdoerffer, Blecher, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

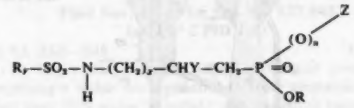
Filed May 7, 1975, Ser. No. 575,097

Claims priority, application Germany, May 18, 1974, 2424243

Int. Cl.² B01F *17/14*; C07F *9/09*

U.S. Cl. 252—355 **7 Claims**

1. An ω-perfluoroalkane sulfonamido-alkane phosphonic or phosphinic acid or salt of the formula



in which

R_f is a perfluoroalkyl radical with from 1 to 12 carbon atoms,

x and *n* each independently is 0 or 1,

Y is hydrogen or a lower aliphatic radical with up to 5 carbon atoms,

Z is an aliphatic radical with up to 5 carbon atoms, a cycloaliphatic, araliphatic or aromatic radical, and

R is hydrogen, an alkali metal, alkaline earth metal, ammonium radical or substituted ammonium radical.

3,970,587

COMBUSTION REGENERATION OF HYDROCARBON CONVERSION CATALYST WITH RECYCLE OF HIGH TEMPERATURE REGENERATED CATALYST

Reuel Shinnar, Great Neck, N.Y.; Paul W. Snyder, Jr., Pitman, and Vern W. Weekman, Jr., Cherry Hill, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed July 18, 1973, Ser. No. 380,172

Int. Cl.² B01J *29/38*, *37/14*; C10G *11/18*

U.S. Cl. 252—417 **6 Claims**

1. A method for regenerating a hydrocarbon conversion catalyst to remove deposited carbonaceous material which comprises,

maintaining a first dense fluid bed of regenerated catalyst in the lower portion of an elongated regeneration zone,

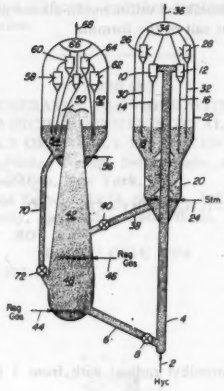
introducing a first oxygen containing regeneration gas stream to an upper portion of said first fluid bed of catalyst and introducing a second oxygen containing regeneration gas stream to a lower bottom portion of said first fluid bed of catalyst,

causing catalyst particles to move continuously upwardly through said first fluid bed into a less dense fluid phase of suspended catalyst particles in regeneration gas traversing an upflow catalyst regeneration zone, wherein the density of suspended catalyst decreases in the direction of flow,

introducing spent catalyst particles with carbonaceous deposits into an upper portion of said first fluid bed of upflowing regenerated catalyst particles above said first oxygen containing gas stream in a ratio of spent catalyst with deposited carbon to regenerated catalyst providing a mix temperature of at least 1200°F.,

separating catalyst particles from regeneration flue gases after traverse of said less dense upflow catalyst regeneration zone and collecting the separated catalyst as a second separate dense fluid bed of regenerated catalyst above said first bed of catalyst,

passing regenerated catalyst from said second catalyst bed to a lower portion of said first bed of catalyst above said



second regeneration gas stream and below said first regeneration gas stream and

withdrawing regenerated catalyst from a lower portion of said first bed for hydrocarbon conversion.

4. The method of claim 1 wherein sufficient oxygen containing regeneration gas is combined with the upflowing suspension of contaminated and regenerated catalyst to assure the conversion of CO to CO_2.

3,970,588

CATALYST FOR HYDRAZINE DECOMPOSITION

William F. Taylor, Scotch Plains, and Martin Lieberman, Newark, both of N.J., assignors to Exxon Research and Engineering Company, Linden, N.J.

Filed Dec. 23, 1969, Ser. No. 3,608

Int. Cl.² B01J *29/10*

U.S. Cl. 252—459 **9 Claims**

1. A catalyst capable of initiating the spontaneous decomposition of hydrazine, hydrazine nitrate, and mixtures thereof into gaseous products, which consists essentially of a minor proportion of ruthenium supported on a major proportion of a stabilized substrate selected from the group consisting of silica, alumina, and silica-alumina, together with a minor proportion of a promoter selected from the group consisting of an oxide of an element of Group IA having an atomic number in the range of 3 to 55, an oxide of an element of Group IIA having an atomic number in the range of 4 to 56, an oxide of a transition element of Group IIIB having an atomic number in the range of 21 to 57, and an oxide of an element of the Lanthanide series having an atomic number in the range of 58 to 71, of the Periodic Table;

the content of ruthenium in said catalyst being within the range of 7.5 to 35 wt. percent of the total catalyst mass,

and the content of said promoter in said catalyst being within the range of from 2 to 10 wt. percent, based on the total catalyst mass.

3,970,589

ACTIVATION AND TREATMENT DURING COOLING OF PLATINUM/ALUMINA CATALYST WITH HCl

John W. Myers, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Apr. 8, 1974, Ser. No. 458,700

Int. Cl.² B01J *21/04, 37/08*

U.S. Cl. 252—466 PT **9 Claims**

1. A method for activating an active alumina supported platinum catalyst which comprises contacting said catalyst at a temperature within the range of 600° to 1500°F with a dry activating gas comprising 30 to 100 volume percent anhydrous hydrogen chloride for at least 0.1 hour;

and thereafter cooling said thus activated catalyst for a time of at least 0.5 hour in the presence of a dry carrier gas containing 1 to 20 volume percent anhydrous hydrogen chloride.

3,970,590

GOLD CONDUCTOR COMPOSITIONS

Lewis Charles Hoffman, Hockessin; Charles William McMunn, New Castle; Arthur Harvey Mones, Wilmington, all of Del., and Oliver Alton Short, Hemel Hempstead, England, assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed June 23, 1975, Ser. No. 588,131

Int. Cl.² H01B *1/06*

U.S. Cl. 252—514 **4 Claims**

1. In a conductor composition of finely divided gold particles and finely divided inorganic binder particles dispersed in an inert liquid vehicle, the improvement comprising, by weight, 95.0–98.1 percent gold particles and, complementally, 1.9–5.0 percent inorganic binder particles, the binder consisting essentially of, by total weight of gold and binder,

0.3–1.5 percent crystalline PbF_2

0.06–0.32 percent crystalline Cu_2O

0.2–1.5 percent crystalline CdO and

0.5–1.95 percent glass,

the glass having the composition

45–52 percent PbO

3–6 percent B_2O_3

30–35 percent SiO_2

4–6 percent TiO_2

2–4 percent ZrO_2

0–1 percent ZnO

1–4 percent Na_2O

0–4 percent CdO and

0–2 percent Li_2O.

3,970,591

ELECTRICAL DISCHARGE DEVICE COMPRISING AN INSULATOR BODY HAVING AN ELECTRICALLY SEMI-CONDUCTING COATING FORMED THEREON

Robert C. Harris, Unadilla, N.Y., assignor to The Bendix Corporation, Southfield, Mich.

Division of Ser. No. 480,199, June 17, 1974. This application Dec. 9, 1974, Ser. No. 530,921

Int. Cl.² H01B *1/06*; H01C *1/06*

U.S. Cl. 252—521 **2 Claims**

1. An electrically semi-conducting coating composition suitable for coating beryllium oxide electric insulators, said coating composition consisting essentially of a mixture of from 25 to 90 percent by weight of lanthanum oxide, from 5 to 75 percent by weight of cuprous oxide and from 0 to 25 percent by weight of ferric oxide.

3,970,592

UNSATURATED HYDROCARBONS AND PROCESS FOR MAKING SAME

Klaus-Jürgen Ploner, Essen-Werden, Germany, assignor to Givaudan Corporation, Clifton, N.J.

Filed Jan. 22, 1975, Ser. No. 543,200

Claims priority, application Switzerland, Nov. 13, 1974, 1259/74

Int. Cl.² A61K 7/46; C11B 9/00; C07C 11/00

U.S. Cl. 252—522 2 Claims

1. 2,7-Dimethyl-1,4,6-octatriene.

2. An odorant composition which contains an olfactorilyeffective amount of 2,7-dimethyl-1,4,6-octatriene and at least one other olfactory agent.

3,970,593

TRICYCLIC HYDROCARBON AND PROCESS FOR PRODUCING THE SAME

Akira Nagakura, Kawaguchi; Susumu Akutagawa, Yokohama, and Haruki Kurihara, Tokyo, all of Japan, assignors to Takasago Perfumery Co., Ltd., Tokyo, Japan

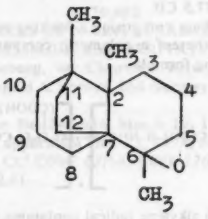
Filed Dec. 27, 1974, Ser. No. 537,039

Claims priority, application Japan, Jan. 11, 1974, 49-6388

Int. Cl.² C07D 303/06

U.S. Cl. 252—522 2 Claims

1. 5,6-Epoxy-1,2,6-trimethyltricyclo[5,3,2,0^{2,7}]dodecane having the formula (I)



(I)

2. A perfume composition having an amber-like odor comprising an olfactory amount of 5,6-epoxy-1,2,6-trimethyltricyclo[5,3,2,0^{2,7}]dodecane according to claim 1.

3,970,594

HARD SURFACE CLEANING COMPOSITIONS

Gene W. Claybaugh, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Filed Mar. 18, 1975, Ser. No. 559,461

Int. Cl.² C11D 3/37

U.S. Cl. 252—524 10 Claims

1. A hard surface cleaning composition comprising:

a. from about .05% to about 15% by weight of a surfactant selected from the group consisting of anionic, nonionic, ampholytic, and zwitterionic surfactants and mixtures thereof;

b. from about 0.5% to about 99% by weight of a builder selected from the group consisting of organic and inorganic builders and mixtures thereof; and

c. from about 0.03% to about 5.0% by weight of a soil removal improvement mixture comprising

1. a water-soluble or dispersible nonionizing primary polymeric material selected from the group consisting of

i. polyvinyl alcohols having a degree of hydrolysis from about 60% to about 100% and a degree of polymerization of from about 100 to about 7000;

ii. polyvinyl pyrrolidones having a degree of polymerization of from about 50 to about 6000; and

iii. mixtures thereof; and

2. an ionizing polysaccharide salt selected from the group consisting of seaweed extracts, plant exudates, seed gums, plant extracts, animal extracts, and biosynthetic gums; the weight ratio of primary polymeric material to polysaccharide salt ranging from about 4:1 to about 1:4.

3,970,595

HEAVY DUTY ALKALINE LIQUID SURFACTANT CONCENTRATE

Martin E. Ginn, Park Forrest, and Irwin Liebman, Oak Park, both of Ill., assignors to Alberto Culver Company, Melrose Park, Ill.

Filed Nov. 27, 1974, Ser. No. 527,545

Int. Cl.² C11D 1/83

U.S. Cl. 252—545 11 Claims

1. A heavy duty alkaline liquid surfactant concentrate, comprising a stable homogeneous mixture containing a total of not over 10% water by weight and consisting essentially of the following ingredients as an unreacted mixture thereof in their stated relative proportions:

a. a liquid water-soluble non-ionic surfactant being the reaction product of ethylene oxide with a hydrophobe selected from the group consisting of the aliphatic monohydric alcohols and the alkyl phenols;

b. a liquid water-soluble ethanolamine salt of an anionic surfactant selected from the group consisting of the alkyl phenol polyethylenoxy alkylene carboxylic acids and the aliphatic hydrogen phosphates, from 10 to 50 parts by weight of said anionic surfactant ethanolamine salt being present per each 100 parts said non-ionic surfactant; and

c. from 2 to 10 parts by weight of aqueous alkali solution per each 100 total parts of said non-ionic and anionic surfactants, said aqueous alkali solution being selected from the group consisting of aqueous solutions of potassium hydroxide and ammonium hydroxide having hydroxyl concentrations of at least 8% by weight based on the alkali solution.

3,970,596

NON-GELLING ALPHA-OLEFIN SULFONATE LIQUID DETERGENT

Stephen Cajetan Klisch, Somerset, and Charles Andrew Martin, Morris Plains, both of N.J., assignors to Colgate-Palmolive Company, New York, N.Y.

Filed Nov. 26, 1973, Ser. No. 419,161

Int. Cl.² C11D 1/12, 3/20, 3/30, 3/34

U.S. Cl. 252—546 30 Claims

1. A liquid detergent consisting essentially of a detersive proportion of about 12 to 22% of water soluble olefin sulfonate salt of a carbon content in the range of 10 to 20, 10–20% of water soluble alcohol ethoxylate sulfate in which the alcohol is of a carbon atom content in the range of 10 to 20 and which contains about 1 to 20 ethoxy groups, a foam stabilizing proportion of at least one foam stabilizer, an anti-gelling proportion, in combination, of at least one halide and at least one nitrate, with the proportion of halide being from 2 to 8% and the proportion of nitrate being from 1 to 15% and with the proportion of nitrate salt being sufficient to inhibit corrosion of ferrous metals and ferrous metal alloys which are brought into contact with the liquid detergent, and an aqueous medium.

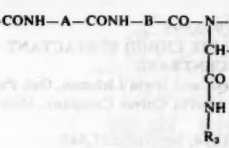
3,970,597

NOVEL SUBSTITUTED POLYAMIDES AND PROCESS FOR PRODUCING THEM

Mordechai Sokolovsky, 10 Rav Ashi St., Tel Aviv; Amihay Freeman, 21 Kiriath Sefer St., Rishon Lezion, and Leon Goldstein, 21 Javits St., Rehovoth, all of Israel

Filed June 4, 1974, Ser. No. 476,320
Claims priority, application Israel, June 15, 1973, 42516
Int. Cl.² C08G 69/50, 18/00
U.S. Cl. 260—72 N 4 Claims

1. A process for preparing substituted polyamides of the general formula



wherein A and B, which may be identical or different, are the hydrocarbon backbone groups of the general formula $-(CH_2)_n-$, where n is an integer, R_2 and R_3 are residues of an aldehyde R_3-CHO or an isocyanide R_3-N ≡ C, where said aldehyde is an aliphatic aldehyde and said isocyanide is a diisocyanoalkane, which comprises:

a. partially hydrolyzing the amide bonds on the surface of a polyamide; and

b. resealing the carboxy- and amino- groups formed by said hydrolysis by reacting with said aldehyde, R_3-CHO, and with said isocyanide, R_3-N ≡ C,

resulting in a polyamide of a molecular weight substantially identical with that of the starting material before the partial hydrolysis, substituted by side-chains on the nitrogen of the newly formed peptide bond.

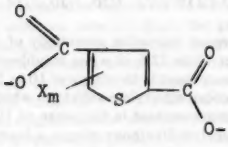
3,970,598

FLAME RETARDANT COMPOSITIONS DERIVED FROM DIFUNCTIONAL CARBOXYLIC ACIDS CONTAINING A HALOGENATED THIOPHERE RING AND METHODS FOR THEIR PREPARATION

Edwin L. Sukman, Fanwood, and Irving Touval, Edison, both of N.J., assignors to M & T Chemicals Inc., Greenwich, Conn.

Continuation-in-part of Ser. No. 316,706, Dec. 20, 1972, abandoned, which is a continuation-in-part of Ser. No. 192,562, Oct. 26, 1971, abandoned. This application July 29, 1974, Ser. No. 492,759
Int. Cl.² C08G 63/12
U.S. Cl. 260—75 S 5 Claims

1. A flame-retardant synthetic polyester wherein a portion of said polyester consists of repeating units selected from the group consisting of



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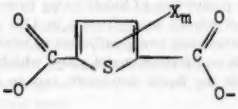
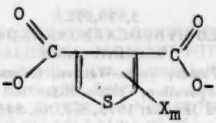


, and



wherein X represents a bromine or chlorine atom and m is the integer 1 or 2, the concentration of said repeating units being equivalent to between 6 and about 15% of said X radical, based on the weight of polyester, when X represents bromine or between 12 and about 20% of said X radical when X represents chlorine, the remaining repeating units being selected from the group consisting of

a. residues of aliphatic and aromatic dicarboxylic acids containing between 2 and 18 carbon atoms, and

b. residues of alkyl, aralkyl and cycloalkyl diols containing between 2 and 12 carbon atoms, wherein said polyester contains at least one member from each of said groups (a) and (b).

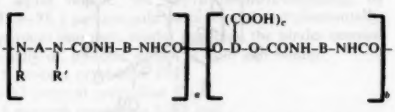
3,970,599

RELEASE AGENTS SUITABLE FOR USE WITH PRESSURE-SENSITIVE ADHESIVE TAPES

Andor Schwarcz, Niskayuna, N.Y., assignor to Nashua Corporation, Nashua, N.H.

Division of Ser. No. 292,905, Sept. 28, 1972, Pat. No. 3,851,761. This application July 1, 1974, Ser. No. 484,792
Int. Cl.² C08G 18/30
U.S. Cl. 260—77.5 CH 10 Claims

1. A release liner comprising a backing member and on at least one side thereof a polymeric composition having the general recurring formula:



wherein A is an alkylene radical containing about 2 to 6 carbon atoms, B is an arylene radical containing about 6 to 16 carbon atoms, D is an aliphatic organic radical containing about 2 to 6 carbon atoms, R is an alkyl radical containing about 12 to 25 carbon atoms, R′ is hydrogen or an alkyl radical containing about 1 to 25 carbon atoms, *a* and *b* represent the number of recurring units and the ratio of *b*/*a* varies from 0 to 2, and *c* is 0, 1 or 2.

3,970,600

STABLE, LIQUID SOLUTIONS OF ISOCYANURATE-POLYISOCYANATES CONTAINING AMIDE AND/OR ACYLUREA GROUPS

Georg Falkenstein, Neustadt; Richard Palm, Ludwigshafen, and Dietrich Wolff, Schwetzingen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Jan. 16, 1975, Ser. No. 541,639
Claims priority, application Germany, Jan. 28, 1974, 2403858
Int. Cl.² C08G 18/79, 18/71, 18/20
U.S. Cl. 260—77.5 NC 7 Claims

1. Stable, liquid solutions of isocyanurate-polyisocyanates containing amide and/or acylurea groups, which solutions contain:

A. From 5 to 40% by weight, based on the total weight of solution, of an isocyanurate-polyisocyanate with amide and/or acylurea groups, containing from 26 to 0.25% by weight of amide and/or acylurea groups, from 29 to 5% by weight of isocyanurate groups and from 40 to 20% by weight of free isocyanate groups, in each case based on the weight of the isocyanurate-polyisocyanate containing amide and/or acylurea groups, and

B. from 95 to 60% by weight, based on the total weight of the solution, of a monomeric diisocyanate and/or polyisocyanate which is free from isocyanurate groups.

3,970,601

COLORED POLY (URETHANE) UREA POWDERS

Karl-Arnold Weber, Leverkusen, Germany; Helmut Reiff, New Martinsville, W. Va., and Dieter Dieterich, Leverkusen, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed May 1, 1975, Ser. No. 573,491
Claims priority, application Germany, May 28, 1974, 2425810
Int. Cl.² C08G *18/00*
U.S. Cl. 260—77.5 Q 5 Claims

1. In a process of producing direct or reverse coatings on substrates by the dry knife coating or screening process, the improvement wherein the coating material comprises thermoplastic polyurea powders characterized by

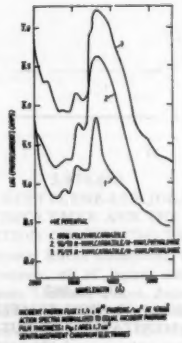
a. a smooth, substantially spherical or lenticular surface,
b. an average particle diameter of 5 to 1000 μ,
c. a urea group content of from 8 to 30 percent by weight,
d. an ionic group content of 0.01 to 0.15 milliequivalents per gram, said ionic group capable of salt formation, and
e. from 0.1 to 10 percent by weight of an organic dye built into the polymer molecule by way of at least one urethane and/or urea group.

3,970,602

COPOLYMERS OF N-VINYLCARBAZOLE AND N-VINYLPHTHALIMIDE AND DERIVATIVES THEREOF

William W. Limburg, 66 Clearview Drive, Penfield, N.Y. 14526, and Donald A. Seanor, 264 Garnsey Road, Pittsford, N.Y. 14534

Division of Ser. No. 342,646, March 19, 1973, Pat. No. 3,877,936. This application Oct. 23, 1974, Ser. No. 517,122
Int. Cl.² C08G *63/68*; C08F *126/12*
U.S. Cl. 260—78.41 13 Claims



1. A copolymer which comprises structural units from N-vinylcarbazole and N-vinylphthalimide.

4. A photoconductive copolymer comprising structural units from (i) N-vinylcarbazole and (ii) N-vinylphthalimide.

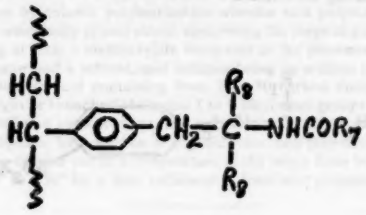
3,970,603

AMINO ACID DERIVATIVES OF CHLOROMETHYLATED POLYMERS AND METHODS OF MAKING THE SAME

Don N. Gray, Sylvania, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Division of Ser. No. 363,377, May 24, 1973, abandoned. This application Oct. 15, 1974, Ser. No. 512,760
Int. Cl.² C08F *222/08*
U.S. Cl. 526—12 9 Claims

1. A resinous polymer consisting essentially of recurring units in its molecular formula as follows:



wherein R_8 is a COOH group or a precursor, and R_7 is an alkyl group of 1 – 5 carbon atoms.

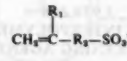
3,970,604

METHOD FOR RECOVERING VINYL SULFONATE MONOMERS

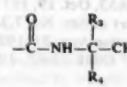
Gary Wentworth, Raleigh, N.C., assignor to Monsanto Company, St. Louis, Mo.

Filed Dec. 18, 1974, Ser. No. 533,898
Int. Cl.² B01D *15/00*, *53/14*; C08F *28/02*; C08L *33/20*
U.S. Cl. 260—79.3 M 6 Claims

4. The method of recovering unreacted sulfonate monomers from slurries produced by the polymerization of acrylonitrile with said sulfonate monomers and other mono-olefinic monomers copolymerizable with acrylonitrile, said sulfonate monomers having the formula



where R_1 is —H or —CH_3, R_2 is —CH_2 or



in which R_3 and R_4 are —H or —CH_3, and X is Na, H or K comprising

a. filtering the slurry to remove polymer solids therefrom to leave a filtrate containing about 0.01 to 1.0 weight percent of said sulfonate monomers,
b. removing said other mono-olefinic monomers from said filtrate,
c. passing the filtrate through activated carbon to remove said sulfonate monomers from the filtrate by adsorption by said carbon, and
d. washing the carbon with an aqueous washing solution containing about 0.1 to 8.0 weight percent acrylonitrile to desorb said sulfonate monomers from the carbon into said washing solution.

3,970,605
METHOD FOR RECOVERING VINYL SULFONATE MONOMERS

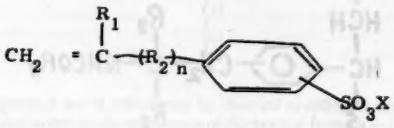
Gary Wentworth, Raleigh, N.C., assignor to Monsanto Company, St. Louis, Mo.

Filed Dec. 18, 1974, Ser. No. 533,899

Int. Cl.² B01D *15/00, 53/14;* **C08F** *28/02;* **C08L** *33/20*

U.S. Cl. 260—79.3 M **7 Claims**

5. The method of recovering unreacted sulfonate monomers from slurries produced by the polymerization of acrylonitrile with said sulfonate monomers and other mono-olefinic monomers copolymerizable with acrylonitrile, said sulfonate monomers having the formula



where R_1 is —H or $—CH_3$, R_2 is $—CH_2O—$, —O—, or $—CH_2—$, n is 0 or 1 and X is Na, K or H comprising

a. filtering the slurry to remove polymer solids therefrom to leave a filtrate containing about 0.01 to 1.0 weight percent of said sulfonate monomers,

b. removing said other mono-olefinic monomers from said filtrate,

c. passing the filtrate through activated carbon to remove said sulfonate monomers from the filtrate by adsorption by said carbon, and

d. washing the carbon with an aqueous washing solution containing about 0.1 to 8.0 weight percent acrylonitrile to desorb said sulfonate monomers from the carbon into said washing solution.

3,970,606
N-VINYL LACTAM INTERPOLYMERS USEFUL AS THICKENING AGENTS

Nathan D. Field, Allentown, and Earl P. Williams, Pen Argyl, both of Pa., assignors to GAF Corporation, New York, N.Y.

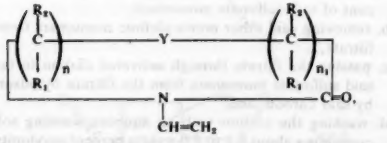
Division of Ser. No. 190,653, Oct. 19, 1971, abandoned, which is a continuation-in-part of Ser. No. 7,241, Jan. 30, 1970, abandoned. This application Aug. 31, 1973, Ser. No. 393,663

Int. Cl.² C08F *15/00, 19/00*

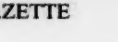
U.S. Cl. 526—260 **13 Claims**

1. A composition comprising an interpolymer consisting of components A, B and C:

COMPONENT A

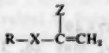


wherein R_1 and R_2 are each selected from the group consisting of hydrogen and alkyl containing 1 to 2 carbon atoms; Y is

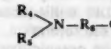


wherein not more than two of R_1 and R_2 are alkyl; and n and n_1 have a value of from 0 to 5, with the proviso that only one of n and n_1 are O;

COMPONENT B

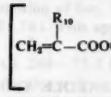


wherein Z is selected from the group consisting of hydrogen, lower alkyl, and phenyl; X is selected from the group consisting of oxygen and carboxy; and R represents the same or different hydrocarbon groups containing from about 6 to 36 carbon atoms selected from the group consisting of normal-chain alkyl, branched-chain alkyl, cycloalkyl and alkylaryl; and containing a member selected from the group consisting of



(1)

$CH_2=CHOCH_2CH_2N^+(CH_3)_2X^-$, and (2)



(3)

wherein R_4 and R_5 each designate a hydrocarbon radical having 1 to 4 carbon atoms and, when taken together with a nitrogen atom to which they are attached, a ring containing not more than 6 carbon atoms, and R_6 represents a hydrocarbon group having from 2 to 4 carbon atoms; X in member (2) represents halogen; R_7, R_8, and R_9 each designate methyl, ethyl, or hydroxyethyl radicals, R_{10} is hydrogen or methyl, and X in member (3) is halogen; said interpolymer comprising from about 20 to about 99 mole % of Component A, from about 0.5 to about 10 mole % of Component B, and from about 0.5 to about 79.5 mole % of Component C.

3,970,607
CONTROLLED HIGH TEMPERATURE POLYMERIZATION OF BUTADIENE

Thomas C. Bouton, Akron, and Shingo Futamura, Munroe Falls, both of Ohio, assignors to The Firestone Tire & Rubber Company, Akron, Ohio

Continuation of Ser. No. 308,062, Nov. 20, 1972, abandoned, which is a continuation-in-part of Ser. No. 132,189, April 7, 1971, abandoned. This application July 29, 1974, Ser. No. 492,573

Int. Cl.² C08F *136/04*

U.S. Cl. 526—335 **8 Claims**

1. Process of subjecting

(I)	a polymerization charge substantially free of diluents and consisting essentially of		
(a)	1,3-butadiene	60–100%	
(b)	compounds copolymerizable with 1,3-butadiene selected from the group consisting of styrene, alpha-alkyl styrenes such as alpha-methyl styrene, ring-alkylated styrenes such as 1-, 2- and 3-methyl and ethyl styrenes, other conjugated diolefins such as isoprene, 2,3-dimethyl-1,3-butadiene, piperylene and the like	40–0%	Based on the weight of (a)+(b)+(c)
(c)	inert hydrocarbons together with	0–10%	
(d)	a 1,2-diene	200–3000	parts by weight per million parts by weight of 1,3-butadiene
(x)	said 1,2-diene having the formula $CH_2=C=CH-R$ wherein R is hydrogen or an alkyl group containing 1–3 carbon atoms		
(II)	in a reactor of a capacity of at least 68 liters, the polymerization charge being sufficient in amount to occupy at least about 35% of the capacity of the reactor, and said reactor being provided with a cooling jacket, and rotary agitator and also being provided with an overhead reflux condenser and with liquid disengagement space to assist in removal of heat, the ratio of the surface of said cooling jacket and vapor disengagement space to the mass of the contents being inadequate, in the absence of said 1,2-diene, to curb the temperature surge as specified at (IV) (c) hereinbelow		
(III)	in the presence of a lithium hydrocarbon of up to 40 carbons		
(IV)	to temperatures initially in the range 27° – 66°C.		
(a)	the temperatures being maintained in this range at least until conversion has reached about 35%		
(b)	the temperatures thereafter being permitted to undergo a surge		
(c)	the presence of the 1,2-diene referred to at (I) (d) acting to curb said surge to a peak not greater than about 204°C.		
(V)	whereby to produce polymers of desirable branched microstructure reflected in		
(a)	freedom from cold flow		
(b)	good tensile strength		
(c)	good tear strength		—in
and			unvulcanized
(d)	good processing characteristics		—state

3,970,608

EPOXIDIZED ACETYLENE-CONJUGATED DIENE RANDOM COPOLYMER AND THE CURABLE COMPOSITION COMPRISING THE SAME

Junji Furukawa, Kyoto; Elichi Kobayashi, Uji, and Takahiro Kawagoe, Tokorozawa, all of Japan, assignors to Bridgestone Tire Company Limited, Tokyo, Japan

Filed Mar. 31, 1975, Ser. No. 563,826

Claims priority, application Japan, Apr. 5, 1974, 49-37993; Apr. 5, 1974, 49-37994

Int. Cl.² C08F *236/04, 236/06, 236/08, 238/02*

U.S. Cl. 526—19 **6 Claims**

1. An epoxidized acetylene-conjugated diene random copolymer of which epoxy equivalent is within the range of from 50 to 1,000, produced by epoxidizing an acetylene-conjugated diene random copolymer, in which acetylene and conjugated diene are bonded linearly and randomly, the block character P is within the range of from 0.8 to 1.2 and the acetylene content is less than 60 mol% with an organic peracid.

3,970,609

METHOD FOR PREPARATION OF POLYMETHACRYLATES BY THE ANIONIC POLYMERIZATION

Lubomír Lochman; Miroslava Rodová, and Jiří Trekoval, all of Prague, Czechoslovakia, assignors to Ceskoslovenska akademie ved, Praha, Czechoslovakia

Filed May 6, 1974, Ser. No. 467,575

Claims priority, application Czechoslovakia, May 7, 1973, 3228-73

Int. Cl.² C08F *120/14*

U.S. Cl. 526—89 **8 Claims**

1. Method for the preparation of polymers of methacrylate esters by anionic polymerization wherein said polymer consists essentially of said esters, comprising the steps of polymerizing at least a methacrylate monomer in the presence of an initiator and a solvent, said initiator being an α-lithio ester of carboxylic acid containing from 2 to 30 carbon atoms in a straight or branched chain and 1 to 6 alkyl ester groups bound to different carbon atoms, and said solvent being an aromatic or aliphatic hydrocarbon or organic ether, said polymerization being carried out at a temperature in the range from between −70° to +50° for a time sufficient to form said polymers.

3,970,610

POLYMERIZATION PROCESS

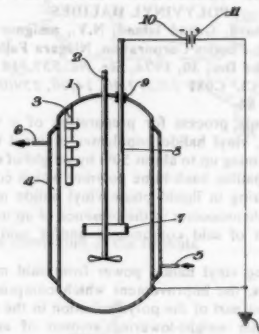
Kasimir Ruchlak, Burgkirchen, Alz; Ernst-August Albers, Bobingen, and Walter Fester, Konigstein, Taunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Germany

Filed Oct. 8, 1974, Ser. No. 513,146

Claims priority, application Germany, Oct. 10, 1973, 2350720

Int. Cl.² C08F *2/18, 14/06*

U.S. Cl. 526—62 **9 Claims**



1. In the process of suspension polymerization of vinyl chloride in a liquid polymerization mixture within a reactor with from 0 to 20 percent by weight of at least one monomer polymerizable therewith in the presence of activators, stabilizers and auxiliary stabilizers normally used in the suspension polymerization of vinylchloride, the improvement comprising minimizing deposits formed on the walls of the reactor during polymerization by conducting the polymerization in a reactor having inner stainless steel or noble metal surfaces in contact with the polymerization mixture, said stainless steel or noble metal surfaces being connected as an anode, said liquid polymerization medium being in contact with at least one cathode insoluble therein and spaced from said anode, said cathode and anode being connected by an external source of current, applying external voltage to said anode and cathode during polymerization thereby electrolytically generating hydrogen and oxygen in the liquid polymerization mixture at said surfaces, the external voltage being of such magnitude that sub-

stantial dissolution of the stainless steel or noble metal surfaces does not occur.

3,970,611

MELT FINISHING PROCESS FOR POLYMERS PRODUCED BY VAPOR STATE POLYMERIZATION PROCESSES

James L. Jezl, St. Charles, and Edwin F. Peters, Winfield, both of Ill., assignors to Standard Oil Company, Chicago, Ill.

Filed Dec. 16, 1974, Ser. No. 533,022

Int. Cl.[2] C08F *2/34, 6/00, 10/00, 14/06*

U.S. Cl. 526—65 22 Claims

1. A process for treating polymer made by the polymerization of at least one polymerizable monomer in a vapor state reactor comprising removing without substantial pressure letdown solid polymer from said vapor state reactor together with reactor off-gases into a post polymerization zone into which a controlled amount of said monomer is introduced and wherein a controlled amount of essentially adiabatic polymerization occurs and said polymer is melted by heat from said adiabatic polymerization and externally added heat to form efficiently transferable, molten polymer.

3,970,612

PROCESS FOR MOLECULAR WEIGHT LOWERING OF POLYVINYL HALIDES

Gilbert Witschard, Grand Island, N.Y., assignor to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Filed Dec. 30, 1974, Ser. No. 537,518

Int. Cl.[2] C08F *2/02, 2/40, 14/06, 259/04*

U.S. Cl. 526—86 13 Claims

1. In the bulk process for preparation of a vinyl halide homopolymer, vinyl halide copolymer or vinyl halide graft polymer containing up to about 50% by weight of comonomer and/or a compatible back-bone polymer which comprises

1. polymerizing in liquid phase vinyl halide monomer or vinyl halide monomer in the presence of up to about 50% by weight of said comonomer and/or said back-bone polymer,
2. recovering vinyl halide power from said monomer or monomers, the improvement which comprises carrying out at least part of the polymerization in the presence of a molecular weight-lowering amount of an organotin mercaptide ester of the formula:

$$R_n\text{-}Sn(\text{-}S\text{-}R'\text{-}COOR'')_{4-n}$$

wherein n is an integer 1 to 3, R and R'' are univalent organic radicals selected independently from the group consisting of alkyl, aryl, alkaryl, and aralkyl radicals, and R' is a divalent organic radical selected from the group consisting of alkylene and aralkylene radicals, with the polymerization being carried out in the presence of an effectively amount of organic azo initiator whereby the polymerization is effetively initiated, said organotin mercaptide ester being added to the polymerization reaction when 0 to no more than about 15 weight percent of said monomer or monomers is converted to polymer, said polymerization being continued in the presence of said organo-tin mercaptide ester to obtain the vinyl halide polymer product in a conversion of at least about 30 weight percent, whereby the molecular weight of the vinyl halide polymer product is substantially lower than the molecular weight of the corresponding polymer obtained by polymerization in the absence of said mercaptide ester.

3,970,613

POLYMERIZATION PROCESS

Brian Peter Forsyth Goldie, Cheam, England; Kenneth Clark Kirkwood, and Alan William Lightbody, both of Larbert, Scotland, assignors to BP Chemicals International Limited, London, England

Filed Mar. 5, 1975, Ser. No. 555,378

Claims priority, application United Kingdom, Mar. 8, 1974, 10598/74

Int. Cl.[2] C08F *4/24, 10/02, 10/04, 10/14*

U.S. Cl. 526—104 12 Claims

1. A process for polymerizing ethylene or a mixture of ethylene and one or more other 1-olefins or 1,3-diolefins comprising contacting a titanium modified heat activated catalyst comprising chromium oxide and a difficulty reducible inorganic oxide support material wherein at least part of the chromium is present in a valency state suitable for polymerization with a first liquid hydrocarbon and then contacting the monomeric material or materials with said catalyst in the presence of a second different liquid hydrocarbon diluent.

3,970,614

NUTRIENT PROTEIN FROM KERATINACEOUS MATERIAL SOLUBILIZED WITH N,N,-DIMETHYLFORMAMIDE

William D. Goodwin, Atlanta, Ga., assignor to The Athlon Corporation, Atlanta, Ga.

Continuation-in-part of Ser. No. 397,625, Sept. 17, 1973, abandoned, which is a continuation-in-part of Ser. No. 167,856, July 30, 1971, Pat. No. 3,773,745. This application Dec. 13, 1974, Ser. No. 532,731

The portion of the term of this patent subsequent to Nov. 20, 1990, has been disclaimed.

Int. Cl.[2] A23J *1/10*

U.S. Cl. 260—123.7 6 Claims

1. A protein composition comprising avian keratinaceous material solubilized by refluxing or boiling with N,N-dimethylformamide at boiling temperature and from which a composition consisting essentially of protein is recovered.

3,970,615

UNSYMMETRICAL MONO-SULFO CONTAINING CHROMIUM COMPLEXES OF AZO DYES

Hans Ulrich Schültz, Basel, Switzerland; Gerhard Back, Lorrach, Germany, and Fabio Beffa, Riehen, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

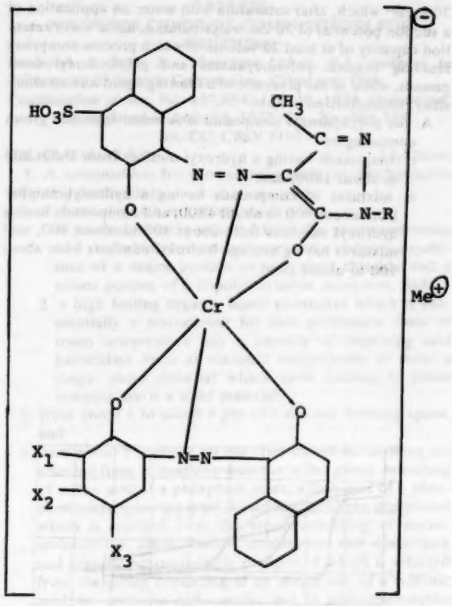
Filed Dec. 24, 1974, Ser. No. 536,059

Claims priority, application Switzerland, Jan. 10, 1974, 287/74

Int. Cl.[2] C09B *45/06, 45/16, 45/48;* D06P *3/24*

U.S. Cl. 260—145 B 5 Claims

1. A chromium complex dye of the formula



(1)

wherein one of the symbols X_1, X_2 and X_3 is hydrogen and each of the others is hydrogen, chloro, nitro or methyl

R is phenyl or phenyl substituted by chloro, lower alkyl or nitro and $Me^{\oplus}$ is a cation.

3,970,616

SYNTHESIS OF CHROME-COMPLEXED DYE DEVELOPERS IN THE PRESENCE OF WEAKLY BASIC ANION EXCHANGE RESINS

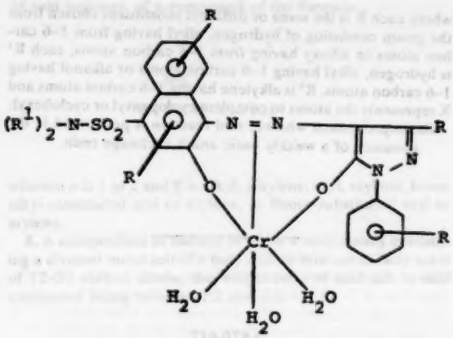
Henry Bader, Newton Center, and Michael H. Feingold, Woburn, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Continuation-in-part of Ser. No. 211,708, Dec. 23, 1971, abandoned. This application Nov. 21, 1973, Ser. No. 418,059

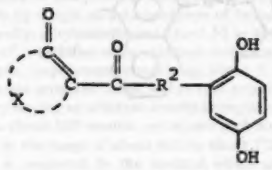
Int. Cl.[2] C09B 45/00, 45/06, 45/16, 45/26

U.S. Cl. 260—147 4 Claims

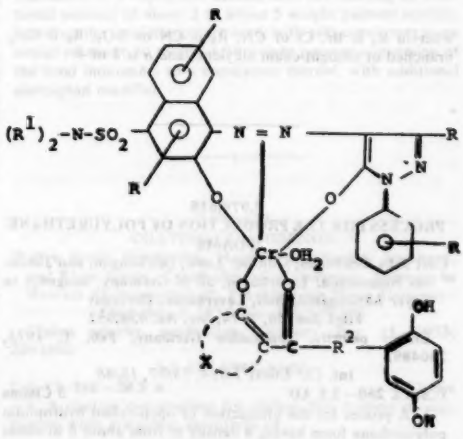
1. In a process comprising the step of reacting a compound of the formula:



with a compound of the formula:



to provide a compound of the formula



where each R is the same or different substituent chosen from the group consisting of hydrogen, alkyl having from 1–6 carbon atoms or alkoxy having from 1–6 carbon atoms, each R^1 is hydrogen, alkyl having 1–6 carbon atoms or alkanol having 1–6 carbon atoms, R^2 is alkylene having 1–6 carbon atoms and X represents the atoms to complete cyclopentyl or cyclohexyl: the improvement wherein said reaction is performed in the presence of a weakly basic anion exchange resin.

3,970,617

NAVY-BLUE NITROPHENYLAZONAPHTHYLAMINO DYES

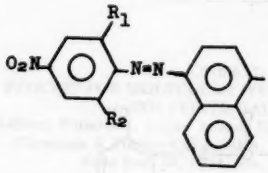
Salvatore A. Bruno, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

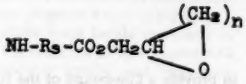
Filed Mar. 7, 1974, Ser. No. 449,064

Int. Cl.² C09B *29/36*; D06P *3/54*

U.S. Cl. 260—152 **5 Claims**

1. Disperse monoazo dye of the formula:





wherein R_1 is Br, Cl or CN; R_2 is CN or NO_2; R_3 is C_{1-4} branched or straight-chain alkylene; and *n* is 3 or 4.

3,970,618

PROCESS FOR THE PRODUCTION OF POLYURETHANE FOAMS

Gert Jabs, Schildgen; Günther Loew, Leichlingen, and Johannes Niggemann, Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Jan. 30, 1974, Ser. No. 438,052

Claims priority, application Germany, Feb. 1, 1973, 2304892

Int. Cl.² C08G *18/14*, *18/77*, *18/48*

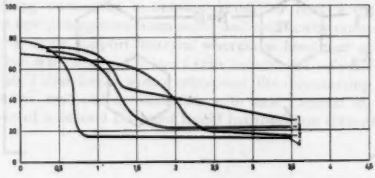
U.S. Cl. 260—2.5 AD **3 Claims**

1. A proces for the production of open-celled hydrophilic polyurethane foam having a density of from about 6 to about 30 kg/m³ which, after saturation with water an application of a suction potential of 30 cm water column, has a water retention capacity of at least 25 volume % which process comprises reacting organic polyisocyanates and polyhydroxyl compounds, while in the presence of a blowing agent and an emulsifier, characterized in that:

A. the polyhydroxyl compound is selected from the group consisting of

i. compounds having a hydroxyl number from about 900 to about 1800, and

ii. mixtures of compounds having a hydroxyl number from about 900 to about 1800, and compounds having hydroxyl numbers from about 300 to about 900, said mixtures having average hydroxyl numbers from about 900 to about 1800,



B. the organic polyisocyanate have at least one aromatically bound isocyanate group containing at least one group selected from the class consisting of urethane, urea, carbodiimide, allophanate, isocyanurate and biuret groups, wherein said polyisocyanates comprise from 5 to 80% by weight of said polyisocyanate containing at least one of said groups and the balance being the monomeric polyisocyanate which is used for the preparation of said polyisocyanates and,

C. said organic polyisocyanates being used in a quantity corresponding to from about 20 to about 60% of the quantity theoretically required for reacting all the hydrogen atoms present in the reaction mixture which are reactive with isocyanate groups.

3,970,619

POLYMERIC HYDROXYLATED POLYESTERETHERS AND POLYURETHANE FLEXIBLE FOAM PREPARED THEREFROM

Thomas C. Snapp, Jr.; Alden E. Blood, and Sam H. Johnson, Jr., all of Longview, Tex., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 19, 1974, Ser. No. 534,527

Int. Cl.² C08G *4/00*, *18/14*, *18/42*

U.S. Cl. 260—2.5 AN **18 Claims**

1. A foamed polyurethane prepared by reacting a polyisocyanate and a foamable composition containing a hydroxylated polyesterether prepared from p-dioxanone, diol and dicarboxylic acid, said hydroxylated polyesterether having an acid number of 1–5 and a hydroxyl number of 30–200.

3,970,620
POLYVINYLCHLORIDE COMPOSITIONS FOR FROTHING

Frederick J. Ihde, Jr., Mountain Lakes, N.J., assignor to Diamond Shamrock Corporation, Cleveland, Ohio

Continuation of Ser. No. 437,054, Jan. 28, 1974, abandoned. This application June 24, 1975, Ser. No. 589,758

Int. Cl.² C08V 9/30

U.S. Cl. 260—2.5 P 14 Claims

1. A composition for producing a foam by mechanically whipping comprising:

a. a plastisol which is a mixture of

1. a particulate resin selected from the group consisting of a vinyl chloride homopolymer and a resinous copolymer of a major portion of said vinyl chloride and a minor portion of a copolymerizable monomer, and

2. a high boiling organic liquid plasticizer which is substantially a non-solvent for said particulate resin at room temperature but is capable of dissolving said particulate resin at elevated temperature to form a single phase material which upon cooling to room temperature is a solid material,

b. from about 1 to about 5 phr of a silicone frothing agent, and

c. from about 5 to about 10 phr of an oleophilic frothing aid selected from at least one member of the group consisting of a free acid of a phosphate ester, a free acid of a phosphite ester, a borate ester, an organic nitrogen compound which is selected from the group consisting of amine, aminoamide, alkanolamide, imidazoline and quaternary and organic nitrogen-sulfur compound which is selected from the group consisting of an amine salt of a sulfonic acid, an aromatic sulfonamide and an aminomercaptan wherein the ester moiety is alkyl, alkenyl, aryl, substituted alkyl, substituted alkenyl, substituted aryl or an alkoxylate thereof.

3,970,621
POWDER COATING COMPOSITION FOR ELECTRODEPOSITION

Taizo Kondo; Komaharu Matsui, and Kunio Yamamoto, all of Hiratsuka, Japan, assignors to Kansai Paint Company, Ltd., Japan

Continuation-in-part of Ser. No. 211,660, Dec. 23, 1971, abandoned. This application Sept. 11, 1974, Ser. No. 505,033

Claims priority, application Japan, Dec. 26, 1970, 45-118724

Int. Cl.² C08L 63/02; C25D 13/06, 13/10

U.S. Cl. 260—18 EP 9 Claims

1. An aqueous powder coating composition for electrodeposition which comprises powdery particles of an epoxy resin from bisphenol and epichlorohydrin powder coating composition having 0.1 to 50 microns particle size wet with an organic liquid which does not dissolve the powdery particles and is essentially insoluble in the aqueous composition and which has a boiling point of 50°–250°C. in an amount of 5–100 parts of organic liquid by weight per 100 parts by weight of the powdery particles, said wet powdery particles dispersed in an aqueous medium containing 0.05–5 parts by weight per 100 parts by weight of the powdery particles of an ionic surface active agent.

3,970,622
HEAT STABILIZERS FOR POLYVINYL CHLORIDE (β-AMINO-β-ARYLACRYLONITRILES)

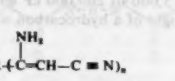
William Baptist Hardy, Bound Brook, and Christos Savides, Piscataway, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed Nov. 24, 1975, Ser. No. 634,946

Int. Cl.² C08J 3/20

U.S. Cl. 260—23 XA 12 Claims

1. A composition comprising a vinyl chloride polymer containing an amount, effective to improve the thermal stability of said polymer, of a compound of the formula:



wherein *n* is 1 or 2 and R is alkyl, alkylene, aryl, arylene, lower alkyl-substituted aryl or arylene, or fluoro-substituted aryl or arylene.

5. A composition as defined in claim 4 additionally containing a divalent metal salt of a fatty acid or mixture of fatty acids of 12–20 carbon atoms, the weight ratio of said salt to said compound being between 1:2 and 2:1.

3,970,623
ADHESIVE COMPOSITION CONTAINING A COPOLYMER OF BUTADIENE, STYRENE, AND ACRYLONITRILE, PLUS A TACKIFYING RESIN

George W. Feeney, Akron, and Gary L. Burroway, Doylestown, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Nov. 29, 1974, Ser. No. 528,299

Int. Cl.² C08L 7/00, 51/00, 53/00, 9/00

U.S. Cl. 260—27 BB 5 Claims

1. An adhesive composition which comprises an admixture of 100 parts by weight of the copolymer of butadiene, styrene and, optionally, acrylonitrile and about 50 to about 150 parts by weight of a tackifier resin selected from rosin esters and diolefin/olefin copolymers containing about 5 to about 35 weight percent aromatic units, where said copolymer is characterized by having an ultimate tensile strength in the range of about 50 to about 100 pounds per square inch and an ultimate elongation in the range of about 600 to about 1200 percent at 25°C, and is prepared by the method which comprises (1) aqueous emulsion free radical polymerizing in the presence of a modifier composed of primary and/or tertiary mercaptans, a monomer mixture comprising a total of 100 weight percent monomers comprised about 3 to about 8 weight percent styrene, about 97 to about 92 weight percent 1,3-butadiene and about 1 to about 4 weight percent acrylonitrile, if used, to a conversion of about 50 to about 75 weight percent of said monomers to a copolymer thereof, and (2) reacting an additional amount of about 2 to about 5 weight percent styrene, based on the total monomers used, with said copolymer to an extent of about 80 to about 98 weight percent conversion of the total monomers to a copolymer thereof, with additional mercaptan modifier.

3,970,624
COATING COMPOSITION

Walter Brotz, Gersthofen; Manfred Engelmann, Augsburg, and Klaus Rieger, Gersthofen, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Dec. 5, 1974, Ser. No. 529,696

Claims priority, application Germany, Dec. 11, 1973, 2361506

Int. Cl.² C08L 91/06

U.S. Cl. 260—28.5 A 2 Claims

1. A coating composition for molten film coating of supporting webs consisting essentially of

70 to 90% by weight of a polypropylene having a crystalline portion of 20 to 60% by weight and a melt viscosity at 170°C of from 5,000 to 200,000 cP and
10 to 30% by weight of a hydrocarbon wax.

3,970,625

PRODUCTION OF UREA-FORMALDEHYDE CONCENTRATES

William Percy Moore, Hopewell; James Earl Sansing, Chester, and Harold Daniel Williamson, Hopewell, all of Va., assignors to Allied Chemical Corporation, New York, N.Y.

Continuation of Ser. No. 341,192, March 14, 1973, abandoned. This application Nov. 14, 1974, Ser. No. 523,622
Int. Cl.² C08L 61/24
U.S. Cl. 260—29.4 R 1 Claim

1. In a process for the production of a stable, aqueous solution of urea-formaldehyde reaction products which comprises incorporating an aqueous formaldehyde solution containing from 30 to 50% by weight formaldehyde and no more than 0.02% by weight of formic acid based on the formaldehyde, with urea containing no more than 0.015% by weight of ammonia, in amount such that the resulting mixture contains a mol ratio of 4.4 to 7.3 mols of formaldehyde for every mol of urea, adjusting the pH of the reaction mixture thus prepared to within the range pH 8.8 to 9.5, thereafter heating said reaction mixture at temperatures in the range 50° to 60°C. for 30 to 60 minutes, and thereafter rapidly evaporating water from said mixture by distillation at temperatures in the range of about 45° to 60°C. under reduced pressure below atmospheric, at which water is vaporized from the mixture until the liquid residue of the evaporation contains 60 to 90% by weight total solids calculated as formaldehyde and urea, the improvement which comprises:

a. heat-treating a portion of said liquid residue of the evaporation for about 48 hours at a temperature of 45° to 50°C., thereby producing a urea-formaldehyde concentrate particularly suitable for manufacture of solid complete fertilizers containing water-insoluble, slow-release nitrogen; and

b. cooling another portion of said liquid residue of the evaporation to ambient temperature and adding sufficient ammonia to said liquid residue to increase the buffer capacity to 12 to 16, thereby producing a urea-formaldehyde concentrate particularly suitable for manufacture of adhesives.

3,970,626

ETHYLENE INTERPOLYMER COMPOSITIONS AND PROCESS

Jack Hurst, Shawnee, Kans., and Harry D. Anspon, Kansas City, Mo., assignors to Gulf Oil Corporation, Pittsburgh, Pa.

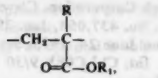
Filed Aug. 14, 1961, Ser. No. 131,108
Int. Cl.² C08F 210/02
U.S. Cl. 260—29.6 WB 17 Claims

1. Ethylene copolymers selected from the group consisting of:

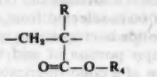
1. Polymers containing 67–99 mol % of units (a) and, correspondingly, 33–1 mol % of units (b),

2. Polymers containing 67–99 mol % of units (a) and, correspondingly, 33–1 mol % of a mixture of units (b) and (d), and

3. Mixtures of (1) and (2):
Said units (a) having the structure $-CH_2-CH_2-$,
Said units (b) having the structure



and said units (d) having the structure



where R is selected from the group consisting of hydrogen and a methyl group, R_1 is an alkali metal cation, and R_4 is an alkyl group, said ethylene polymers being further characterized in:

(i) having the units (a), (b) and (d) substantially uniformly distributed throughout the polymer chains, and

(ii) being sufficiently thermoplastic that they can be extruded and molded.

3,970,627

FLUOROCARBON POLYMER COATING COMPOSITIONS CONTAINING MICA PARTICLES

Herman Ernest Seymus, Lint, Belgium, assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Sept. 24, 1973, Ser. No. 400,040
Int. Cl.² C08L 27/18
U.S. Cl. 260—29.6 F 5 Claims

1. An aqueous coating composition consisting essentially of:

a. 40–93%, by weight of the total of (a), (b) and (c) solids, of a particulate fluoropolymer,

b. 5–35%, by weight of the total of (a), (b) and (c) solids, of colloidal silica stabilized with sodium ions, or a mixture of said silica with a water-soluble alkali metal silicate, in a ratio in the range between 25:75 and 90:10 respectively,

c. 2–25%, by weight of the total of (a), (b) and (c) solids, of mica particles coated with a pigment, and

d. water as a carrier.

3,970,628

AQUEOUS DISPERSIONS OF THERMOSETTABLE SYNTHETIC ADDITION POLYMERS WITH 1,2-EPOXY RESIN PLASTICIZER

William Connelly, Willowdale; Hamid Iqbal Khan, Toronto, and Ian Hugh McEwan, Kleinburg, all of Canada, assignors to Canadian Industries, Ltd., Montreal, Canada

Continuation-in-part of Ser. No. 378,598, July 12, 1973, abandoned. This application Jan. 30, 1974, Ser. No. 437,960
Claims priority, application United Kingdom, July 14, 1972, 33084/72; July 14, 1972, 33085/72; July 14, 1972, 33086/72
Int. Cl.² C08L 63/10
U.S. Cl. 260—29.6 NR 14 Claims

1. A process for producing an aqueous dispersion of a thermosettable, solid, water insoluble, synthetic addition polymer consisting essentially of copolymerizing in water

a. from about 98.49 to about 32.5% by weight based on the weight of total monomer solids of at least one α,β-ethylenically unsaturated main monomer selected from the group consisting of styrene, lower alkyl methacrylate, lower alkyl acrylates, lower alkyl itaconates, lower alkyl maleates and lower alkyl fumarates with

b. from about 1% to about 10% by weight based on the weight of total monomer solids of at least one α,β-ethylenically unsaturated monomer containing a reactive group selected from the group consisting of acrylic acid, methacrylic acid, itaconic acid, maleic acid, fumaric acid, acrylamide, lower alkyl acrylamides, N-alkoxy modified

acrylamides, diacetone acrylamide, maleamic acid, maleamide, fumaride, N-mono-lower alkyl amides, N-monophenylamides, hydroxyethyl methacrylate and hydroxypropyl methacrylate, said polymerization taking place in the presence of

c. from about 0.5% to about 50.0% by weight based on the weight of total monomer solids of a plasticizer which is a 1,2-epoxy resin and of

d. from about 0.01% to about 7.5% by weight based on the weight of total monomer solids of a stabilizing material selected from the group consisting of, alone or in combinations thereof, surface active agents, suspension agents, and water soluble, copolymerizable ionic monomers selected from the group consisting of vinyl sulphonate, allyl sulphonate and sulphoesters of the formula:-

$R-CO_2-Q-SO_3M$

wherein R is selected from the group consisting of vinyl and α-chloro-or α-alkyl-substituted vinyl, Q is a divalent hydrocarbon radical having its valence bonds on different carbon atoms and M is a cation selected from the group consisting of sodium, potassium, lithium, morpholinium, lower alkyl substituted morpholinium, ammonium, substituted ammonium of the formula NR^1_4, wherein R_1 is selected from the group consisting of hydrogen, lower alkyl and lower alkanolamino.

3,970,629

COMPOSITION FOR PAPER COATING

Nobujiro Izaki, Niihama; Masashi Nakayama, Osaka; Saburo Mishiba, and Sadao Sekiguchi, both of Niihama, all of Japan, assignors to Sumitomo Naugatuck Co., Ltd., Japan

Continuation of Ser. No. 386,289, Aug. 7, 1973, abandoned. This application Dec. 9, 1974, Ser. No. 531,199

Claims priority, application Japan, Aug. 7, 1972, 47-78936

Int. Cl.² C08L *1/02, 3/04, 9/08*

U.S. Cl. 260—29.7 T **13 Claims**

1. A paper coating composition having improved blister-preventing, ink transferability, water-resistant and pick-resistant properties which comprises a pigment and, as a pigment binder, a synthetic copolymer latex consisting essentially of from 24.5 to 50 parts by weight of at least one aliphatic conjugated diolefin, from 0.5 to 10 parts by weight of at least one ethylenically unsaturated carboxylic acid and from 40 to 75 parts by weight of at least one monoolefinic monomer copolymerizable with the aliphatic conjugated diolefin and the ethylenically unsaturated carboxylic acid, the gel content of said copolymer being not more than 40% by weight based on the weight of the synthetic copolymer.

3,970,630

2,4-QUINAZOLINE DIONE-POLYAMIDE-ESTER RESINS

Choua Cohen, Grenoble; Durif Durif Varambon, Eybens; Robert Salle, and Bernard Sillion, both of Grenoble, all of France, assignors to Institut Francais du Petrole, es Carburants et Lubrifiants et Entreprise de Recherches et d'Activities Petroliers Elf, Rueil-Malmaison, France

Filed Mar. 18, 1974, Ser. No. 452,258

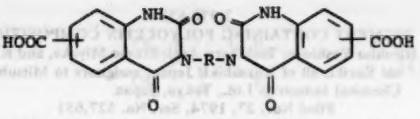
Claims priority, application France, Mar. 21, 1973, 73.10225

Int. Cl.² C08G *63/68, 69/44, 73/06*

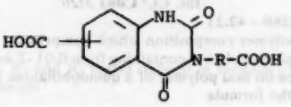
U.S. Cl. 260—30.2 **24 Claims**

1. A condensation polyamide-ester resin of a polycarboxylic component, a polyamine component and a polyhydroxy component, said resin being characterized in that:

said polycarboxylic component comprises a proportion of 5 to 100%, calculated as carboxylic equivalents, of at least one dicarboxylic compound containing one or two 2,4-quinazoline dione rings, and selected from the dicarboxylic acids of the general formulae:



and



in which R is a divalent radical selected from the aliphatic, alicyclic and aromatic radicals and their lower alkyl esters, and a proportion of 0–95%, calculated as carboxylic acid equivalents, of at least one polycarboxylic compound selected from the aromatic polycarboxylic acids (other than aromatic polycarboxylic acids having 2 carboxylic groups in either the ortho or peri positions relative to each other) and their lower alkyl esters,

said polyamine component comprising a proportion of 70 to 100%, calculated as amine equivalents, of at least one aromatic primary diamine and a proportion of 0 to 30%, calculated as amine equivalents, of an amine selected from the aliphatic primary diamines, melamine and piperazine,

and said polyhydroxy component comprises a proportion of 50 to 100% of hydroxy equivalents of at least one polyol containing at least 3 hydroxy groups, and a proportion of 0 to 50%, as hydroxy equivalents, of at least one diol selected from the aliphatic and cycloaliphatic diols,

said polyamine component and said polyhydroxy component being used in proportions corresponding to a ratio of the sum of the amine and hydroxy groups to the sum of the carboxylic groups higher than 1 and a ratio of the sum of the amine groups to the sum of the carboxylic groups in the range of 0.1 –0.4.

3,970,631

TRIESTERS OF TRIETHANOLMETHANE AND MONOCARBOXYLIC ACIDS AS PLASTICIZERS FOR POLYVINYL CHLORIDE

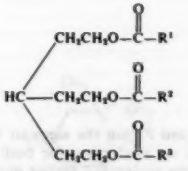
Robert Bacskai, Kensington, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Division of Ser. No. 414,584, Nov. 9, 1973, Pat. No. 3,939,201. This application Aug. 25, 1975, Ser. No. 607,632

Int. Cl.² C08K *5/10*

U.S. Cl. 260—31.6 **5 Claims**

1. Polyvinyl chloride containing a triester of the following formula:



wherein R^1, R^2 and R^3 are alkyl or hydrocarbyl aryl groups having from 2 to 14 carbon atoms.

3,970,632

PIGMENT CONTAINING POLYOLEFIN COMPOSITION

Hirohisa Yoshiura; Toshiharu Arai; Masao Miyake, and Kiyoshi Enriki, all of Kurashiki, Japan, assignors to Mitsubishi Chemical Industries Ltd., Tokyo, Japan

Filed Nov. 27, 1974, Ser. No. 527,651

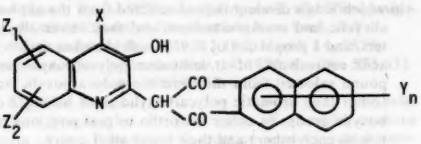
Claims priority, application Japan, Nov. 27, 1973, 48-132912

Int. Cl.[2] C08J 3/20

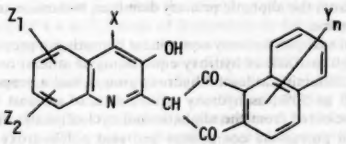
U.S. Cl. 260—42.21 3 Claims

1. A polymer composition which comprises:

a polyolefin polymer containing from 0.01–2 weight percent based on said polymer of a quinophthalone pigment having the formula

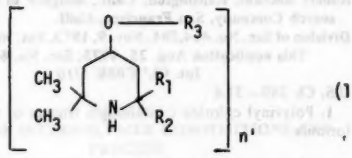


or



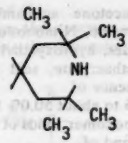
wherein X represents hydrogen or halogen, Y represents halogen, Z_1 represents hydrogen, halogen, lower alkyl or lower alkoxy, Z_2 represents hydrogen, or halogen and n represents 0 or an integer of 1–4; and 0.005–5% by weight of an ultraviolet light absorbing imidazolidine compound or an ultraviolet light absorbing piperidine compound selected from the group consisting of

a piperidine compound having the formula:

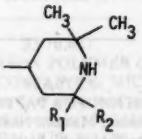


(1)

wherein R_1 and R_2 are the same or different and each represents an alkyl group or both form a saturated alicyclic ring having 5–7 carbon atoms while sharing a common carbon atom, or form a ring having the formula

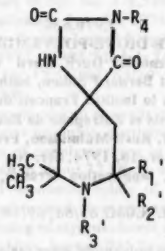


n' is an integer of 1, 2 or 3; and R_3 represents, when $n' = 1$, a monovalent acyl group, an N-substituted carbamoyl group, an N-substituted thiocarbamoyl group, a monovalent group formed by removing one hydroxyl from an oxyacid; alkyl, cycloalkyl, aralkyl, aryl or a group having the formula

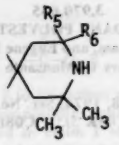


wherein R_1 and R_2 are as defined above; R_3 represents, when $n' = 2$, a diacyl, a dicarbamoyl, a bisthiocarbamoyl, a carbonyl group, or a divalent group formed by removing two hydroxyl groups from an oxyacid; an alkylene, an arylene, or an arylenedialkylene group; or R_3 represents, when $n' = 3$, a triacyl group, a tricarbamoyl group, a tristhiocarbamoyl group, a trivalent group formed by removing three hydroxyl groups from an oxyacid; an alkanetolyl group, an arylinetolyl group or an arylinetolyl trialkylene group;

piperidine-4-spiro-hydantoin derivatives having the formula:

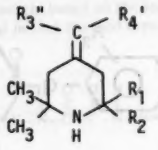


wherein R_1' and R_2' are the same or different and each represent an alkyl group or both form a saturated alicyclic ring having 5–7 carbon atoms while sharing a common carbon atom, or form a ring having the formula



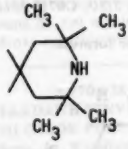
wherein R_5 and R_6 are the same or different and each represents an alkyl group or both form a saturated alicyclic ring having 5–7 carbon atoms while sharing a common carbon atom; R_3' and R_4' are the same or different and each represents hydrogen, an alkyl group, a cycloalkyl group or an aryl group and can have an oxirane oxygen;

a piperidine derivative or organic acid salt thereof having the formula



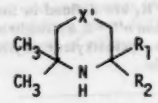
(3)

wherein R_1 and R_2 are the same or different and each represents an alkyl group or both form a saturated alicyclic ring having 5–7 carbon atoms while sharing a common carbon atom, or form a ring having the formula



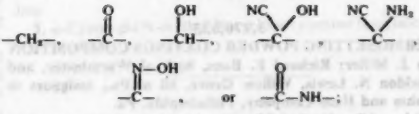
and R_3'' and R_4' are the same or different and each represents cyano, aryl, alkoxycarbonyl, acyl or carbamoyl;

a piperidine derivative or organic acid salt thereof having the formula



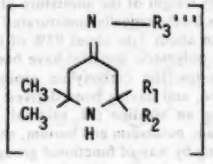
(4)

wherein R_1 and R_2 are as defined in formula (3) and X' represents



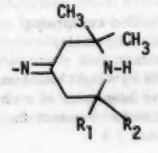
and

an iminopiperidine derivative or organic acid salt thereof having the formula:

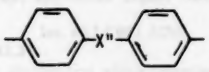


(5)

wherein R_1 and R_2 are as defined in formula (3), n'' represents an integer of 1 or 2, and R_3''' represents, when $n'' = 1$, alkyl, aralkyl, cycloalkyl, aryl, arylamino, ureido, thioureido, or a group having the formula:



wherein R_1 and R_2 are defined in formula (3), or R_3''' represents, when $n''=2$, a straight chain or a branched chain alkylene, cycloalkylene, arylene, or a group having the formula:



wherein X'' represents —O—, —S—, —S—S—, —NH— or $-(CH_2)_m-$ and m represents 0 or an integer from 1–6.

3,970,633

THERMOSETTING POWDER COATINGS COMPOSITION

John J. Miller; Richard E. Baus, both of Warminster, and Sheldon N. Lewis, Willow Grove, all of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Division of Ser. No. 360,856, May 16, 1973, abandoned. This application Nov. 11, 1974, Ser. No. 522,561

Int. Cl.² C08K 3/10; C08F 236/04, 226/00, 216/02

U.S. Cl. 260—42.29 12 Claims

1. As a composition of matter, a thermosetting powder addition copolymer salt composition, the polymer having units derived from:

1. about 1 to about 30% by weight of at least one (C_2-C_8)-hydroxyalkyl ester of acrylic acid or methacrylic acid or a mixture of said hydroxyalkyl esters ;
2. about 1 to about 30% by weight of at least one monoethylenically α,β-unsaturated carboxylic acid or a mixture of said acids; and
3. about 55 to about 98% by weight of at least one (C_1-C_{18}) alkyl ester of acrylic acid or methacrylic acid, or a mixture of said alkyl esters or an admixture containing said mixtures and up to about 60% by weight of the admixture of an additional copolymerizable α,β-ethylenically unsaturated monomer or monomers, wherein about 7 to about 95% of the carboxylic acid groups of the polymeric material have been neutralized to carboxylate groups, the carboxylate groups thus being partially neutralized, and having been derived from a liquid composition having an alkaline pH, said salt groups being selected from sodium, potassium and barium, any crosslinking of the polymer being by way of functional groups supplied by the monomers which make up said polymer.

3,970,634

POLYHEXAMETHYLENE ADIPAMIDE MOLDING COMPOSITIONS NOT SUBJECT TO DISCOLORATION WHEN CONDITIONED WITH WATER

Peter Horn, Ludwigshafen; Claus Cordes, Weisenheim, and Richard Pflueger, Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Claims priority, application Germany, June 14, 1974, Ser. No. 2428759

Filed May 12, 1975, Ser. No. 576,355

Int. Cl.² C08J 3/20

U.S. Cl. 260—45.7 S 4 Claims

1. A molding composition comprising:

1. polyhexamethylene adipamide,
2. a phenolic antioxidant, and
3. from 0.001 to 0.5% by weight based on the weight of said polyhexamethylene adipamide of a chain transfer agent having a chain transfer constant for styrene at 100°C which is greater than 1.5.

3,970,635

FIRE RETARDANT POLYESTER FIBERS

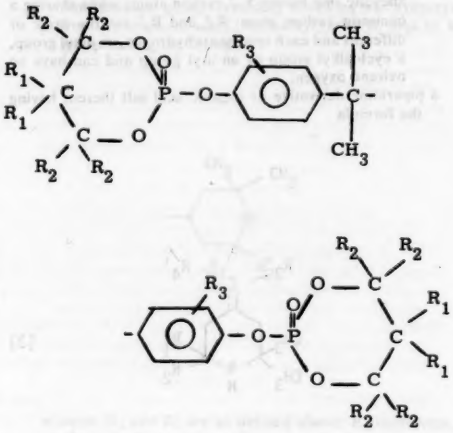
Ernest L. Lawton, Durham, and Eugene L. Ringwald, Raleigh, both of N.C., assignors to Monsanto Company, St. Louis, Mo.

Filed Jan. 28, 1974, Ser. No. 437,412

Int. Cl.² C08K 5/52; C08L 67/02

U.S. Cl. 260—45.8 R 12 Claims

1. The method of imparting fire retardancy to synthetic fibers in which the fiber-forming substance is any long chain synthetic polymer composed of at least 85% by weight of an ester of a dihydric alcohol and terephthalic acid comprising adding to the polymer prior to spinning not more than about 20%, based on the weight of the polymer, of a compound having the general formula:



Wherein R_1 is an alkyl group containing 1–5 carbon atoms; R_2 is a radical selected from the group consisting of H and an alkyl group containing 1–5 carbon atoms; and R_3 is a radical selected from the group consisting of hydrogen or a 1–5 carbon alkyl group.

3,970,636

TETRAMETHYLPIPERIDINYLPHOSPHINE OXIDES AS LIGHT STABILIZERS FOR POLYMERS

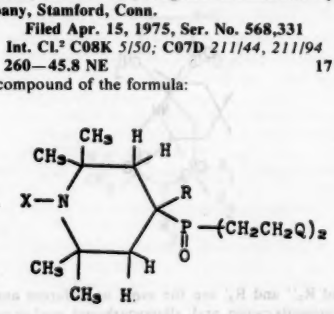
William Baptist Hardy, Bound Brook, and Peter Vincent Susi, Middlesex, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed Apr. 15, 1975, Ser. No. 568,331

Int. Cl.² C08K 5/50; C07D 211/44, 211/94

U.S. Cl. 260—45.8 NE 17 Claims

1. A compound of the formula:



wherein X is —H, —OH, or —O·; R is —H or —OH; and Q is —C ≡ N or

where R′ is alkyl of 1 to 18 carbon atoms or hydrogen.

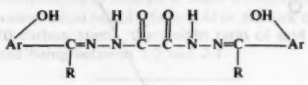
12. A polymer composition containing an amount of a compound as defined in claim 1 effective to stabilize said polymer against degradation by ultraviolet radiation.

3,970,637
STABILIZED POLYMERIC COMPOSITION AND PRODUCT USING SAME

Ray Lawson Hartless, Lopatcong Township, Warren County, and Anthony Marion Trozzolo, Murray Hill, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Aug. 27, 1974, Ser. No. 500,958
Int. Cl.² C08J 3/20
U.S. Cl. 260—45.9 NC **7 Claims**

1. Article including at least one metallic portion in intimate contact with a plastic portion, said metallic portion including at least one element which accelerates the oxidative degradation of at least a component of the said plastic portion, the said plastic portion including a polymeric composition which is at least 90 percent by weight nominally ethylenically saturated polymer, exclusive of filler, the said plastic portion containing a metal deactivator to lessen the acceleration of oxidation degradation due to the said metallic portion said metal deactivator being contained within the range of from 0.01 percent to 5.0 percent by weight based on the said polymeric composition; characterized in that the said metal deactivator is of the structure



in which R is a methyl grouping or higher homologue alkyl grouping, in which Ar is a single aryl ring or fused aryl ring structure, in which the indicated hydroxy substituent is in a position ortho to the

grouping and is the only hydroxy substituent ortho to the said

grouping, in which there are permitted additional substituents on any ring position of the said Ar grouping other than that occupied by the said hydroxy grouping provided that such additional substituents do not include substituents which impair activity of hydroxy substituents.

3,970,638
SMOKE RETARDANT VINYL CHLORIDE AND VINYLIDENE CHLORIDE POLYMER COMPOSITIONS

Elmer Douglas Dickens, Jr., Richfield, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Filed Dec. 10, 1975, Ser. No. 639,272
Int. Cl.² C08J 3/20
U.S. Cl. 260—45.75 N **12 Claims**

1. A smoke retardant composition comprising a vinyl chloride or vinylidene chloride polymer together with (A) at least one nickel compound selected from the group consisting of $NiCrO_4$, NiO and $Ni_3(PO_4)_2$ and (B) at least one antimony compound selected from the group consisting of antimony metal, $SbCl_3$, Sb_2S_3, $Sb_2(SO_4)_3$, sodium meta-antimonate and antimony triacetate, said compounds (A) and (B) being present in a total amount from about 0.25 to about 20 weight parts per 100 weight parts of polymer.

3,970,639
ETHYL α-CYANO β-(N-METHYL-N-CYCLOHEXYLAMINO) ACRYLATE STABILIZER

William F. Cordes, III, East Brunswick, and Robert E. Diehl, Trenton, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed Sept. 22, 1975, Ser. No. 615,871
Int. Cl.² C08J 3/20; C07C 121/00
U.S. Cl. 260—45.85 A **3 Claims**

1. Polycarbonate stabilized against the deteriorating effects of ultraviolet radiation by an effective amount of a stabilizer which is ethyl α-cyano-β-(N-methyl-N-cyclohexylamino)acrylate.

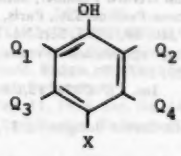
3. α-Cyano-β-(N-methyl-N-cyclohexylamino)acrylate.

3,970,640
PROCESS FOR THE PRODUCTION OF POLYPHENYLENE ETHERS HAVING A DESIRED POLYMERIZATION DEGREE

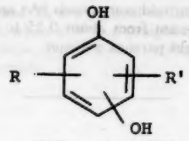
Eiichi Yonemitsu, Kashiwa; Akitoshi Sugio, Tokyo; Takao Kawaki, Tokyo; Akihiko Konishi, Tokyo, and Zempei Mizutani, Tokyo, all of Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo, Japan

Filed June 26, 1974, Ser. No. 483,329
Claims priority, application Japan, June 26, 1973, 48-72084
Int. Cl.² C08G 63/62
U.S. Cl. 260—47 ET **9 Claims**

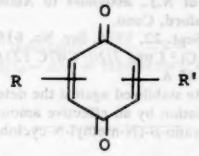
1. In a process for the production of polyphenylene ethers by oxidative polycondensation phenols, represented by a formula



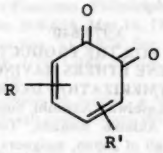
wherein X represents a substituent selected from the class consisting of hydrogen, chlorine, bromine and iodine atoms, Q_1 represents a monovalent substituents selected from the class consisting of hydrogen, alkyl, haloalkyl having at least two carbon atoms between the halogen atom and the phenyi nucleus, alkoxy and haloalkoxy having at least two carbon atoms between the halogen atom and the phenyl nucleus, Q_2, Q_3 and Q_4 are the same as Q_1 or halogen atom, provided that Q_1, Q_2, Q_3 and Q_4 are each free from a tertiary α-carbon atom, in the presence of a complex catalyst compound composed of a copper, manganese or cobalt salt as well as a primary, secondary or tertiary mono- or diamine as ligand, the method for producing polyphenylene ethers having any desired polymerization degree the improvement which comprises terminating the oxidative polycondensation-reaction by adding a reducing agent and simultaneously at least one member selected from the class consisting of dioxybenzenes and benzoquinones to the reaction medium at the stage of the desired polymerization degree, said dioxybenzenes being represented by the formula



and said benzoquinones being represented by the formula



or by the formula



wherein R and R′ represents each a hydrogen atom or a substituent selected from the class consisting of alkyl and alkoxy having at most 4 carbon atoms.

3,970,641

ANTIBIOTIC 27,706 RP AND SALT THEREOF

Georges Jolles, and Gérard Ponsinet, both of Sceaux, France, assignors to Rhone-Poulenc S.A., Paris, France

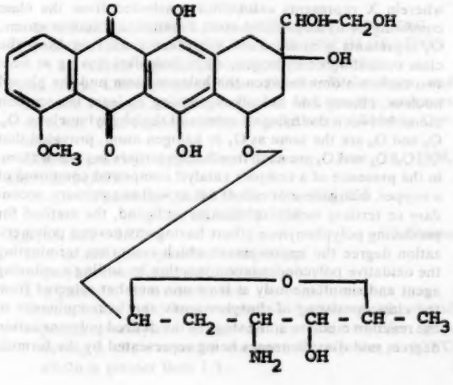
Filed Jan. 19, 1972, Ser. No. 219,065

Claims priority, application France, Jan. 20, 1971, 71.01793; Nov. 23, 1971, 71.41849

Int. Cl.[2] C07H *15/00*

U.S. Cl. 536—17 **2 Claims**

1. The antibiotic herein designated 27,706 RP of the formula:



and non-toxic acid addition salts thereof.

3,970,642

PROCESS FOR THE CONVERSION OF NIDDAMYCIN TO LEUCOMYCIN A_1, LEUCOMYCIN A_3, CARBOMYCIN B AND OTHER ANTIBIOTICS AND RELATED 3-O-ESTERS

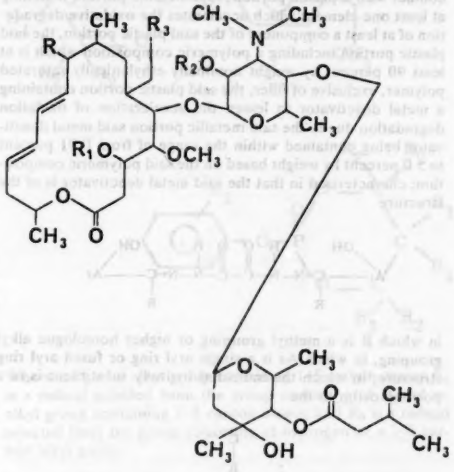
Leslie Alan Freiberg, Waukegan, Ill., assignor to Abbott Laboratories, North Chicago, Ill.

Filed June 3, 1974, Ser. No. 476,016

Int. Cl.[2] C07H *15/04*

U.S. Cl. 536—17 **25 Claims**

1. A compound having the structural formula



wherein R is oxygen, R_1 is hydrogen, HCO, CH_3CO, CH_3CH_2CO or $CH_3CH_2CH_2CO$; where R_2 is hydrogen or equivalent to R_1 and R_3 is $CH(OCH_3)_2$.

3,970,643

5″-AMINO-3′,5″-DIDEOXYBUTIROSIN A AND DERIVATIVES

Peter Wing Kee Woo, and Theodore Herbert Haskell, both of Ann Arbor, Mich., assignors to Parke, Davis & Company, Joseph Campau at the River, Mich.

Filed Apr. 17, 1975, Ser. No. 569,129

Int. Cl.[2] C07H *15/22*

U.S. Cl. 536—17 **2 Claims**

1. A member of the class consisting of O-2,6-diamino-2,3,6-trideoxy-α-D-ribo-hexopyranosyl-(1 → 4)-O-[5-amino-5-deoxy-β-D-xylofuranosyl-(1 → 5)]-N^1-[(S)-4-amino-2-hydroxy-1-oxobutyl]-2-deoxystreptamine and pharmaceutically acceptable acid addition salts thereof.

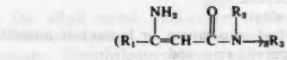
3,970,644

HEAT STABILIZERS FOR POLYVINYL CHLORIDE (β-AMINO-β-ARYLACRYLAMIDES)

William Baptist Hardy, Bound Brook, and Christos Savides, Piscataway, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed Nov. 24, 1975, Ser. No. 634,947
Int. Cl.² C08J 3/20
U.S. Cl. 260—23 XA 15 Claims

1. A composition comprising a vinyl chloride polymer containing an amount, effective to improve the thermal stability of said polymer, of a compound of the formula:



wherein R_1 is aryl or lower alkyl-substituted aryl; R_2 is hydrogen or lower alkyl; n is 1 or 2; and R_3 is hydrogen or lower alkyl when n is 1 and is alkylene of 1 to 4 carbon atoms or thiodiethylene when n is 2.

4. A composition as defined in claim 1 wherein, in said compound, R_1 is phenyl, lower alkyl-substituted phenyl, or naphthyl; R_2 is hydrogen; n is 1; and R_3 is hydrogen or lower alkyl.

5. A composition as defined in claim 4 additionally containing a divalent metal salt of a fatty acid or mixture of fatty acids of 12–20 carbon atoms, the weight ratio of said salt to said compound being between 1:2 and 2:1.

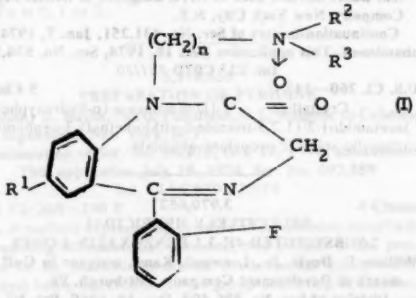
3,970,645

1,4-BENZODIAZEPINE DERIVATIVE

Poul Nedenskov, Birkerod, Denmark, assignor to Aktieselskabet Grindstedvaerket, Arhus, Denmark

Filed Aug. 15, 1974, Ser. No. 497,771
Claims priority, application United Kingdom, Aug. 24, 1973, 40259/73
Int. Cl.² C07D 243/24
U.S. Cl. 260—239.3 D 1 Claim

1. A compound of the formula:



wherein R^1 is chloro, R^2 and R^3 are ethyl, and n is 2.

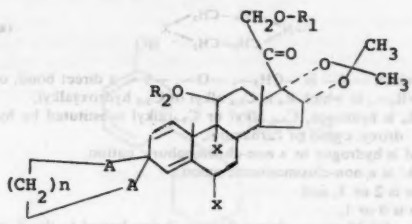
3,970,646

HALO-STEROIDAL THIOKETALS

Robert A. Mallory, and Joseph A. Settepani, both of Somerville, N.J., assignors to Ortho Pharmaceutical Corporation, Raritan, N.J.

Filed Apr. 24, 1974, Ser. No. 463,707
Int. Cl.² C07J 5/00
U.S. Cl. 260—239.55 D 13 Claims

1. A compound of the formula:



wherein R_1 is hydrogen, lower acyl having 2–5 carbon atoms, tetrahydropyranyl or lower alkyl; R_2 is hydrogen or lower acyl having 2–5 carbon atoms; A is sulfur or oxygen, provided that at least one of A is sulfur; x is fluoro, chloro or bromo; and n is an integer from 0–3.

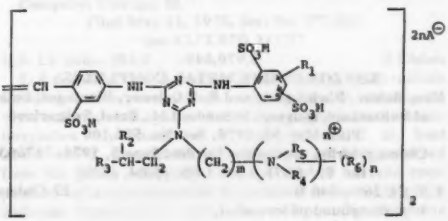
3,970,647

BIS-(TRIAZINYLAMINO)STILBENE COMPOUNDS

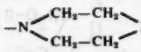
Hans Balzer, Munchenstein; Fritz Fleck, Bottmingen, and Hans-Rudolf Schmid, Riehen, all of Switzerland, assignors to Sandoz Ltd., Basel, Switzerland

Filed Feb. 11, 1974, Ser. No. 441,376
Claims priority, application Switzerland, Feb. 16, 1973, 2326/73
Int. Cl.² C07D 251/04
U.S. Cl. 260—240 B 26 Claims

1. A compound of formula I,



wherein
R_1 is hydrogen, chlorine or C_{1-4} alkyl,
R_2 is hydrogen or methyl,
R_3 is cyano or $-CONR_7R_8$, in which either R_7 and R_8, independently, each is hydrogen, C_{1-4} alkyl or C_{2-4} hydroxyalkyl, or R_7 and R_8, together with the nitrogen atom to which they are attached, are a pyrrolidine, piperidine or morpholine radical,
either R_4 and R_5, independently, each is C_{2-4} alkyl or C_{2-4} hydroxyalkyl,
or R_4 and R_5, together with the nitrogen atom, form a radical of formula (a),



(a)

in which $-X-$ is $-CH_2-$, $-O-$, $-S-$, a direct bond, or $-NR_9-$, in which R_9 is C_{1-3} alkyl or C_{2-3} hydroxyalkyl,
R_6 is hydrogen, C_{1-6} alkyl or C_{2-4} alkyl substituted by hydroxy, cyano or carbamoyl,
M is hydrogen or a non-chromophoric cation,
A^- is a non-chromophoric anion,
m is 2 or 3, and
n is 0 or 1,
the $-SO_3M$ group, shown floating, being bound to the 4- or 5-position of the benzene ring and, when *n* is 1, R_6 being bound either to the nitrogen or, when NR_4R_5 is a thiomorpholino ring, to the nitrogen or to the sulfur thereof or, when NR_4R_5 is a piperazine ring, to one or the other of the nitrogens thereof.

3,970,648
2-[2-(5-NITRO-2-FURYL)VINYL]-4-(ANILINO)-QUINAZOLINES

Herman Horn, Staten Island, N.Y.; Sheldon B. Greenbaum, Livingston; Charles M. Ely, Berkeley Heights, both of N.J.; Walter Hacke, New York, N.Y., and David A. Olle, North Arlington, N.J., assignors to Diamond Shamrock Corporation, Cleveland, Ohio

Filed Sept. 6, 1974, Ser. No. 503,854
Int. Cl.² C07D *405/06*
U.S. Cl. 260—240 A **2 Claims**

1. 2-[2-(5-nitro-2-furyl)vinyl]-4-(p-hydroxyanilino)-quinazoline.

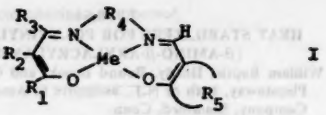
2. The process of producing the compound of claim 1 comprising reacting 2-[2-(5-nitro-2-furyl)vinyl]-4-chloroquinazoline with p-aminophenol.

3,970,649
BISAZOMETHINE METAL COMPLEXES

Hans Bohler, Rheinfelden, and Rolf Griesser, Binningen, both of Switzerland, assignors to Sandoz Ltd., Basel, Switzerland

Filed May 30, 1975, Ser. No. 582,100
Claims priority, application Sweden, June 5, 1974, 747663
Int. Cl.² C07F *3/06, 1/06, 15/04, 15/06*
U.S. Cl. 260—240 G **22 Claims**

1. A compound of formula I,



I

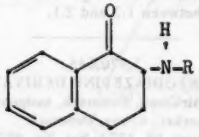
in which
R_1 is alkyl,
R_2 is alkylcarbonyl, alkoxycarbonyl or $-CONR_6R_7$,
R_3 is hydrogen or alkyl
R_4 is an aromatic carbo- or heterocyclic bivalent radical bound through ortho or peri-positions
R_5, together with the >C=C< group, signifies an aromatic carbo- or heterocyclic ring,
R_6 is hydrogen or alkyl,
R_7 is hydrogen, alkyl or a mono- or bi-nuclear aromatic carbo- or heterocyclic ring, and
Me is a bivalent transition metal atom or zinc.

3,970,650
DERIVATIVES OF TETRALONE AND THE PREPARATION THEREOF

Pierre M. Vanhoof, Brussels, Belgium, assignor to A. Christiaens Societe Anonyme, Brussels, Belgium

Filed Sept. 16, 1975, Ser. No. 613,828
Claims priority, application United Kingdom, Sept. 16, 1974, 40296/74
Int. Cl.² C07D *213/50*
U.S. Cl. 260—240 B **3 Claims**

1. 2-R-amino-tetralin-1-ones of the formula:



(I)

in which R represents a pyridyl or phenyl radical which may be substituted, in the ortho, meta or para position, by a methoxy group, as well as the acid addition salts thereof.

3,970,651
CRYSTALLINE CEPHALOSPORIN DERIVATIVE

Murray Arthur Kaplan, Syracuse, and Alphonse Peter Granatek, Baldwinsville, both of N.Y., assignors to Bristol-Myers Company, New York City, N.Y.

Continuation-in-part of Ser. No. 431,251, Jan. 7, 1974, abandoned. This application Dec. 18, 1974, Ser. No. 534,114
Int. Cl.² C07D *501/20*
U.S. Cl. 260—243 C **9 Claims**

1. Crystalline 7-[D-α-amino-α-(p-hydroxyphenyl-)acetamido]-3-(1,2,3-triazole-5-ylthiomethyl)-3-cephem-4-carboxylic acid 1,2-propylene glycolate.

3,970,652
SELECTIVELY HERBICIDAL 2-SUBSTITUTED-4H-3,1-BENZOXAZIN-4-ONES

William C. Doyle, Jr., Leawood, Kans., assignor to Gulf Research & Development Company, Pittsburgh, Pa.

Division of Ser. No. 886,403, Dec. 18, 1969, Pat. No. 3,914,121. This application June 2, 1972, Ser. No. 259,241
Int. Cl.² C07D *265/22*
U.S. Cl. 260—244 R **4 Claims**

1. 2-(m-Trifluoromethylphenyl)-4H-3,1-benzoxazin-4-one.

3,970,653
SULFOSUCCINATE DERIVATIVES AS DETERGENT BUILDERS

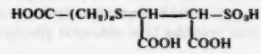
Vincent Lamberti, Upper Saddle River, N.J., assignor to Lever Brothers Company, New York, N.Y.

Division of Ser. No. 394,613, Sept. 5, 1973, Pat. No. 3,925,375, which is a division of Ser. No. 156,933, June 25, 1971, abandoned. This application June 24, 1975, Ser. No. 589,960

Int. Cl.² C07D 295/00; C07C 143/00

U.S. Cl. 260—247.1 E 3 Claims

1. An α-carboxyalkylthio-β-sulfosuccinic acid having the formula:



or the alkali metal, ammonium, monoethanolammonium, diethanolammonium, triethanolammonium, methylammonium, dimethylammonium, trimethylammonium, tetramethylammonium, morpholinium, N-methylmonoethanolammonium and N-ethylmonoethanolammonium salt thereof, wherein *n* is 1 or 2.

3,970,654
ANTIVIRAL 2(1H)-QUINAZOLINONE DERIVATIVES

Michihiro Yamamoto; Shigeaki Morooka, both of Nishinomiya; Masao Koshiba, Amagasaki; Shigeho Inaba, Takarazuka, and Hisao Yamamoto, Nishinomiya, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

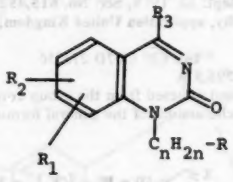
Filed July 30, 1974, Ser. No. 493,240

Claims priority, application Japan, Aug. 14, 1973, 48-91590

Int. Cl.² C07D 239/82

U.S. Cl. 260—251 QB 5 Claims

1. A quinazolinone of the formula,



[I]

wherein R is bicyclic or tricyclic saturated alicyclic C_{7-10} hydrocarbon radical; R_1 is hydrogen; R_2 is nitro; R_3 is phenyl; and *n* is 0, 1 or 2.

3,970,655
PREPARATION OF PYRIDINE

Anthony B. Baylis, North Plainfield, N.J., assignor to Celanese Corporation, New York, N.Y.

Continuation of Ser. No. 80,175, Oct. 12, 1970, abandoned. This application July 29, 1974, Ser. No. 492,559

Int. Cl.² C07D 213/10

U.S. Cl. 260—290 P 4 Claims

1. A method of preparing pyridine which consists essentially of reacting acetaldehyde, ammonia and oxygen in the presence of an aldehyde-ammonia condensation catalyst said catalyst being selected from the group consisting of alumina, silica, silica-alumina and silica-alumina metal oxides said metal oxides being selected from the group consisting of ZrO_2, MgO, TiO_2, ThO_2, CuO, ZnO, and PbO at a temperature of from about 300° to about 550°C, ammonia being present in an amount of from 0.2 to about 15.0 mols/mol of acetaldehyde, and oxygen being present in an amount of from 0.1 to about 5.0 mols/mol of acetaldehyde.

3,970,656
1-ALKYL-4-M-HYDROXYPHENYL-4-PROPIONYL PIPERIDINES

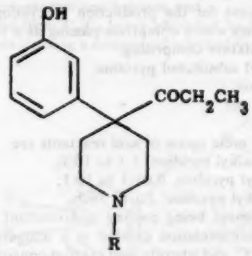
Everette Lee May, Bethesda, Md., assignor to Government of the United States, Washington, D.C.

Filed June 11, 1974, Ser. No. 478,547

Int. Cl.² C07D 211/32

U.S. Cl. 260—293.8 5 Claims

1. A compound of the formula



wherein R is alkyl of 4 to 7 carbon atoms or a pharmaceutically acceptable acid addition salt thereof.

3,970,657
PREPARATION OF CYANOPYRIDINES

Glenn R. Elion, Avenel, and Arthur E. Klink, Lebanon, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Nov. 18, 1975, Ser. No. 633,055

Int. Cl.² C07D 213/57

U.S. Cl. 260—294.9 5 Claims

1. A process for the production of cyanopyridines from alkyl pyridines which comprises passing as a reactant stream a gaseous mixture comprising:

1. an alkyl substituted pyridine;
2. ammonia;
3. steam; and
4. oxygen

wherein the mole ratios of said reactants are:

ammonia:alkyl pyridine, 1:1 to 10:1;
steam:alkyl pyridine, 0.01:1 to 10:1;
oxygen:alkyl pyridine, 2:1 to 50:1;

the improvement being passing said reactant stream over a fixed bed ammoxidation catalyst at a temperature of about 280° to 400°C. and wherein said catalyst consists essentially of $(V_2O_5+MoO_3+P_2O_5+MnSO_4)/TiO_2$ in a molar ratio of 2.9:1.0:0.15:1.2/12.0.

3,970,658
NITRILE PROCESS

Ellis K. Fields, River Forest, Ill., assignor to Standard Oil Company, Chicago, Ill.

Filed May 15, 1975, Ser. No. 577,684

Int. Cl.² C07D 213/57

U.S. Cl. 260—294.9 5 Claims

1. A decarboxylation process for substituting cyano radicals for silver carboxylate radicals which comprises reacting the silver salt of a carboxylic acid with silver cyanide under decarboxylation conditions at a temperature of at least 320°C–450°C, the said silver carboxylate salt being selected from the group consisting of silver salts of benzene compounds, biphenyl compounds, naphthalene compounds, phenanthrene compounds, anthracene compounds, thiophene

compounds, pyridine compounds, quinoline compounds, isoquinoline compounds, benzothiophene compounds, dibenzothiophene compounds and phenanthridine compounds; said silver carboxylate radicals are from 1 to 4 in number.

3,970,659

PREPARATION OF CYANOPYRIDINES

Glenn R. Elion, Avenel, and Arthur E. Klink, Lebanon, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Nov. 18, 1975, Ser. No. 632,935
Int. Cl.² C07D 213/57
U.S. Cl. 260—294.9 5 Claims

1. A process for the production of cyanopyridines from alkyl pyridines which comprises passing as a reactant stream a gaseous mixture comprising:
1. an alkyl substituted pyridine;
2. ammonia;
3. steam; and
4. oxygen

wherein the mole ratios of said reactants are:
ammonia:alkyl pyridine, 1:1 to 10:1;
steam:alkyl pyridine, 0.01:1 to 10:1;
oxygen:alkyl pyridine, 2:1 to 50:1;
the improvement being passing said reactant stream over a fixed bed ammoxidation catalyst at a temperature of about 280° to 400°C. and wherein said catalyst consists essentially of $(V_2O_5+MoO_3+P_2O_5)/(TiO_2+Al_2O_3)$ in a molar ratio of 2.5:1.0:0.01/21.8:5.7.

3,970,660

CHEMILUMINESCENCE

Laszlo Joseph Bollyky, Stamford, Conn., assignor to American Cyanamid Company, Stamford, Conn.

Continuation of Ser. No. 211,807, Dec. 23, 1971, abandoned, which is a division of Ser. No. 844,657, July 24, 1969, abandoned, which is a continuation-in-part of Ser. No. 547,782, May 5, 1966, abandoned. This application July 22, 1974, Ser. No. 490,427
Int. Cl.² C07D 211/86
U.S. Cl. 260—295 L 1 Claim

1. Bis(1,2-dihydro-2-oxo-1-pyridyl)glyoxal.

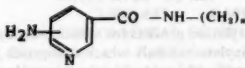
3,970,661

2-AMINO, 5-CARBAMOYL PYRIDINE COMPOUNDS

Gilbert Regnier, Chatenay Malabry; Roger Canevari, Villebon-sur-Yvette, and Xavier Pascaud, Paris, all of France, assignors to Science Union et Cie, Societe Francaise de Recherche Medical, Suresnes, France

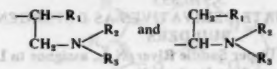
Filed May 1, 1974, Ser. No. 465,931
Claims priority, application United Kingdom, May 2, 1973, 73/20842
Int. Cl.² C07D 213/75
U.S. Cl. 260—295.5 A 4 Claims

1. A compound selected from the group consisting of:
(A) Heterocyclic amides of the formula I:



(I)

wherein:
n is selected from 0 and 1, and
R is selected from the group consisting of:



wherein:
R_1 is selected from the group consisting of hydrogen and methyl, and
R_2 and R_3 which are the same, are selected from the group consisting of linear and branched alkyl having from 1 to 6 carbon atoms inclusive, and
(B) physiologically tolerable acid addition salts thereof.

3,970,662

4-(3-NITROPHENYL)-2,3,5,6-PYRIDINETETRACARBOXYLIC ACID AND INTERMEDIATES

Philip M. Carabateas, and Gordon L. Williams, both of Schodack, N.Y., assignors to Sterling Drug Inc., New York, N.Y.

Filed June 19, 1975, Ser. No. 588,380
Int. Cl.² C07D 213/55
U.S. Cl. 260—295.5 R 3 Claims

1. Tetra-(lower-alkyl) 4-(3-nitrophenyl)-2,3,5,6-pyridinetetracarboxylate.

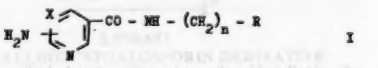
3,970,663

CERTAIN AMINO-NICOTINAMIDE DERIVATIVES

Gilbert Regnier, Chatenay Malabry; Roger Canevari, Villebon-sur-Yvette, and Xavier Pascaud, Paris, all of France, assignors to Science Union et Cie, Societe Francaise de Recherche Medical, Suresnes, France

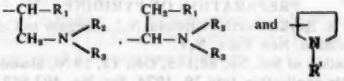
Division of Ser. No. 465,931, May 1, 1974. This application Sept. 22, 1975, Ser. No. 615,452
Claims priority, application United Kingdom, May 2, 1973, 20842/73
Int. Cl.² C07D 213/56
U.S. Cl. 260—295.5 A 7 Claims

1. A compound selected from the group consisting of :
A. Heterocyclic amides of the general formula I :

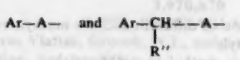


I

wherein:
X is CH ;
n is selected from 0 and 1, and
R is selected from the group consisting of :



wherein :
R_1 is selected from the group consisting of hydrogen and methyl, $R_2$and R_3 joined together represent a polymethylenic chain of the formula $-(CH_2)_p-$ wherein *p* is an integer from 4 to 7 inclusive and
R′ is selected from the group consisting of saturated and unsaturated acyclic hydrocarbon radicals having from 1 to 6 carbon atoms inclusive in linear and branched chains, cycloalkyl having from 3 to 7 carbon atoms, and radicals of the formula :



wherein :

A is selected from the group consisting of a single bond and saturated and unsaturated acyclic hydrocarbon radicals having from 1 to 6 carbon atoms inclusive in linear and branched chains, and

Ar and R'', which are the same or different, are selected from the group consisting of unsubstituted phenyl or phenyl substituted by one or more radicals selected from the group consisting of linear and branched alkoxy having from 1 to 6 carbon atoms inclusive, methylenedioxy, ethylenedioxy and trimethylenedioxy ; and

B. physiologically tolerable acid addition salts thereof.

3,970,664

PREPARATION OF TRIAZOLO BENZODIAZEPINES

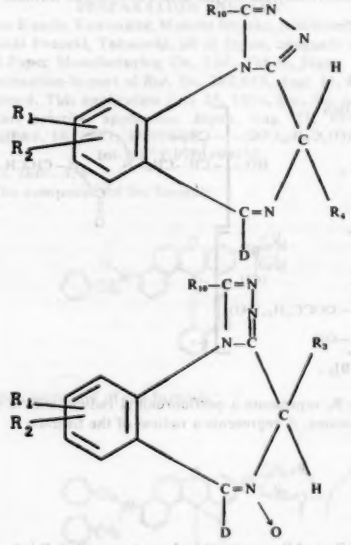
Leo Henryk Sternbach, Upper Montclair, and Armin Walser, West Caldwell, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 271,434, July 13, 1972, Pat. No. 3,879,406. This application Jan. 13, 1975, Ser. No. 540,626

Int. Cl.[2] C07D *487/04*

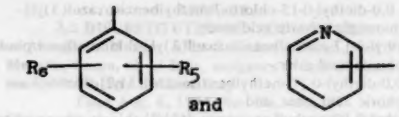
U.S. Cl. 260—296 T **2 Claims**

1. A process for the preparation of a compound selected from the group



wherein

D is selected from the group consisting of



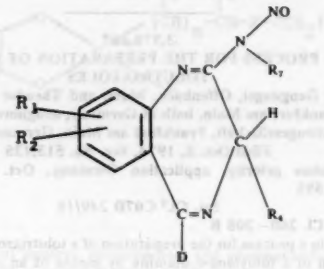
and

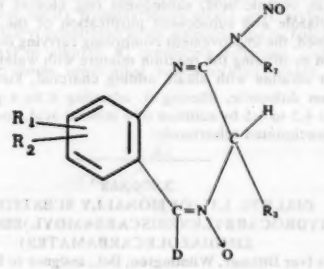
R_1 and R_2 are each selected from the group consisting of hydrogen, halogen, nitro and trifluoromethyl; R_3 is selected from the group consisting of hydrogen and lower alkyl; R_4 is selected from the group consisting of hydrogen and lower alkyl;

R_5 and R_6 are selected from the group consisting of hydrogen, trifluoromethyl and halogen and

R_{10} is selected from C_1-C_6 lower alkyl and hydrogen,

which comprises treating a compound selected from the group consisting of





wherein

D, R_1, R_2, R_3 and R_4 are as above, and R_7 is lower alkyl, with a C_1-C_7 lower alkanoyl hydrazide.

3,970,665

BENZISOXAZOLO (THIONO)PHOSPHORIC(PHOSPHONIC)ACID ESTERS

Walter Lorenz, Wuppertal, Cronenberg; Horst Boshagen, Haan, Rhineland; Ingeborg Hammann, and Wolfgang Behrenz, both of Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Continuation of Ser. No. 169,498, Aug. 5, 1971, abandoned. This application Dec. 3, 1973, Ser. No. 421,319

Claims priority, application Germany, Aug. 14, 1970, 2040410

The portion of the term of this patent subsequent to June 25, 1991, has been disclaimed.

Int. Cl.[2] C07D *261/20*

U.S. Cl. 260—307 DA **5 Claims**

1. A benzisoxazolo(thiono)phosphoric acid ester selected from the group consisting of:

0,0-diethyl-0-[5-chloro-7-methylbenzisoxazol(3)yl]-thionophosphoric acid ester,
0-ethyl-0-[7-methylbenzisoxazol(3)yl]-thiono-ethane phosphonic acid ester,
0,0-diethyl-0-[7-methylbenzisoxazol(3)yl]-thionophosphoric acid ester, and
0-ethyl-0-[5-methylbenzisoxazol(3)yl]-thiono-ethane phosphonic acid ester.

3,970,666

3,5-DISUBSTITUTED-4-(α-AMINO-α-PHENYL-O-TOLYL)-4H-1,2,4-TRIAZOLES

Martin Gall, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed June 3, 1974, Ser. No. 475,459
Int. Cl.² C07D *233/56, 233/64, 249/08*
U.S. Cl. 260—308 R **12 Claims**

1. 4-]α-amino-4-chloro-α-(o-chlorophenyl)-o-tolyl]-3-cyclopropyl-5-methyl-4H-1,2,4-triazole.

3,970,667

PROCESS FOR THE PREPARATION OF PURE TOLUTRIAZOLES

Kurt Gengnagel, Offenbach, Main, and Theodor Papenfuhs, Frankfurt am Main, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Oct. 8, 1974, Ser. No. 513,125
Claims priority, application Germany, Oct. 13, 1973, 2351595
Int. Cl.² C07D *249/16*
U.S. Cl. 260—308 B **4 Claims**

1. In a process for the preparation of a tolutriazole by diazotation of a toluylene-o-diamine by means of an alkali nitrite and an organic acid, subsequent ring closure to form the tolutriazole and subsequent purification of the tolutriazole obtained, the improvement comprising carrying out the purification by diluting the reaction mixture with water, then making it alkaline with alkali, adding charcoal, kieselguhr and sodium dithionite, filtering it, adjusting it to a pH-value of about 4.5 to 6.5 by addition of a mineral acid, and separating the precipitated tolutriazole.

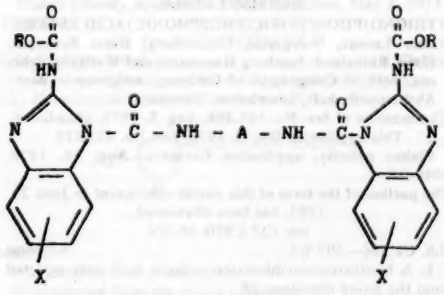
3,970,668

DIALKYL 1,1'-(OPTIONALLY SUBSTITUTED HYDROCARBYLENEBISCARBAMOYL)BIS(2-BENZIMIDAZOLECARBAMATES)

Bruce Ivor Dittmar, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 841,987, July 15, 1969, abandoned. This application Feb. 25, 1972, Ser. No. 229,559
Int. Cl.² C07D *235/32*
U.S. Cl. 260—309.2 **6 Claims**

1. A compound of the formula:



wherein
the R's can be the same or different and are methyl, ethyl, isopropyl or sec-butyl;
X is hydrogen, halogen, methyl or methoxy;
A is a difunctional group of 1 to 18 carbon atoms selected from
alkylene;
alkylene substituted by oxa, N-methylaza or thia;
alkenylene;
cycloalkylene;
cycloalkenylene;
bis(cyclohexylene)methylene;
alkylenated alkylcyclohexylene;
alkylated cyclohexylene;
alkylenated cyclohexylene;
bicycloalkylene;
phenylene;
methylated phenylene; and
bis(phenylene)methylene.

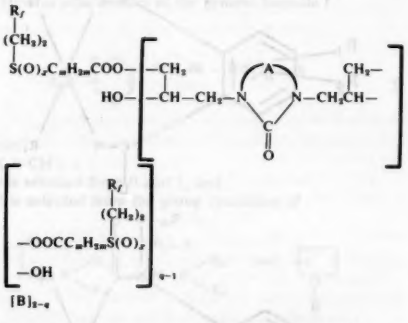
3,970,669

N-HETEROCYCLIC PERFLUOROALKYLOARBOXYLIC ACID ESTERS, PROCESS FOR THEIR MANUFACTURE AND THEIR USE

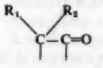
Armin Hiestand, Binningen, and Horst Jager, Bettingen, both of Switzerland, assignors to Ciba-Geigy AG, Basel, Switzerland

Division of Ser. No. 436,553, Jan. 25, 1974, Pat. No. 3,914,225. This application June 11, 1975, Ser. No. 585,997
Claims priority, application Switzerland, Feb. 2, 1973, 1562/73
Int. Cl.² C07D *49/32*
U.S. Cl. 260—309.5 **11 Claims**

1. Perfluoroalkylcarboxylic acid esters of the formula



wherein R_f represents a perfluoroalkyl radical with 4 to 18 carbon atoms, A represents a radical of the formula



wherein R_1 and R_2 represent hydrogen or methyl, B is [—O—] or [—OH Cl—], m is a whole number from 1 to 3, q is 1 or 2 and x is 0, 1 or 2, with x being 0 or 1 if m is 1.

3,970,670

9-THIAPROSTAGLANDINS

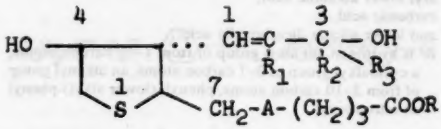
Isidoros Vlattas, Summit, N.J., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 460,837, April 15, 1974, which is a continuation-in-part of Ser. No. 361,752, May 18, 1973, Pat. No. 3,881,017. This application Oct. 21, 1974, Ser. No. 516,293

Int. Cl.² C07D 333/24

U.S. Cl. 260—332.2 A 7 Claims

1. A 7-[3α-(3-hydroxy-3-hydrocarbylpropyl or -1-propen- or ynyl)-4-hydroxy-tetrahydro-2β-thienyl]-heptanoic or 5-heptenoic acid of the formula



wherein R is hydrogen, an alkli metal, one equivalent of an alkaline earth metal, ammonium, mono,-, di or tri-lower alkylammonium, alkyl with up to 12 carbon atoms, lower akenyl, lower alkynyl, Ph or Ph-C_nH_{2n}, wherein Ph is phenyl, (lower alkyl)phenyl, (halo)-phenyl or (triflurometh yl)-phenyl, *n* is an integer from 1 to 4, A is ethylene or ethenylene, each of R_1 and R_2 is hydrogen or lower alkyl, and R_3 is alkyl with up to 12 carbon atoms, lower alkenyl or lower alkynyl, or the 1,2-dihydro-derivatives or 1,2-dehydro-derivatives thereof.

3,970,671

CHROMOGENIC COMPOUNDS AND METHOD FOR PREPARATION THEREOF

Mitsuru Kondo, Kawanishi; Makoto Miyake, Nishinomiya, and Hiroshi Iwasaki, Takatsuki, all of Japan, assignors to Kanzaki Paper Manufacturing Co., Ltd., Tokyo, Japan

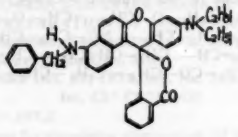
Continuation-in-part of Ser. No. 282,055, Aug. 21, 1972, abandoned. This application July 23, 1974, Ser. No. 491,133

Claims priority, application Japan, Aug. 21, 1971, 46-63830; Nov. 16, 1971, 46-92047

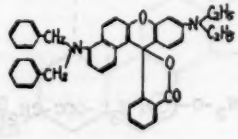
Int. Cl.² C07D 493/10

U.S. Cl. 260—335 2 Claims

1. The compound of the formula,



2. The compound of the formula,



3,970,672

2,2 DISUBSTITUTED-BENZODIOXOLES

Elso Manghisi, Monza; Aldo Salimbeni, Milan, and Pietro Menella, Como, all of Italy, assignors to Istituto Luso Farmaco d'Italia S.r.l., Milan, Italy

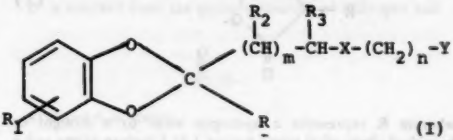
Filed Aug. 6, 1974, Ser. No. 495,147

Claims priority, application Italy, Aug. 9, 1973, 27736/73; July 4, 1974, 24811/74

Int. Cl.² C07D 317/44

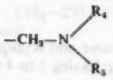
U.S. Cl. 260—340.5 12 Claims

1. A 1,3-benzodioxole of the formula



(I)

and its optical isomers, stereoisomers and pharmaceutically acceptable salts, in which R represents hydrogen, lower alkyl, halogeno(lower alkyl), hydroxy(lower alkyl), aryl, arylalkyl, or aryl or arylalkyl substituted in the aromatic ring by halogen, alkyl, hydroxyl or alkoxyl; R_1 represents hydrogen, one or more halogen atoms, lower alkyl, halogeno(lower alkyl), a



group

wherein R_4 and R_5 are as defined below, hydroxyl, alkoxyl, a sulphonic acid group, sulphamido, N,N-dialkylsulphamido, nitro, amino, substituted amino, or alkylsulphonylamino, or R_1 is a benzene ring condensed on the benzodioxole nucleus; R_2 represents hydrogen, alkyl, aryl or hydroxyl; *m* represents 0, 1 or 2; R_3 represents hydrogen, lower alkyl, aryl, hydroxyl or cyano; *n* represents 0, 1, 2 or 3; X represents O or S; and Y represents hydrogen, aryl (substituted or unsubstituted in the aromatic ring by halogen, alkyl, hydroxyl or alkoxyl), a X—CH_2—CH_2—Y group, or a

group,

wherein R_4 and R_5 are hydrogen, lower alkyl, monocyclic carbocyclic aryl, or lower monocarbocyclic arylalkyl.

3,970,673

PROCESS FOR PREPARING BICYCLIC γ-LACTONE

Kiyosi Kondo, Yamato; Masakatsu Matsumoto, Sagamihara, and Fumio Mori, Kurashiki, all of Japan, assignors to Sagami Chemical Research Center, Tokyo, Japan

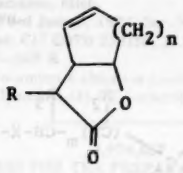
Filed May 29, 1975, Ser. No. 582,002

Claims priority, application Japan, May 29, 1974, 49-59637; Sept. 26, 1974, 49-109977

Int. Cl.² C07D *307/77, 307/93*

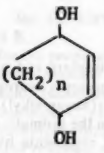
U.S. Cl. 260—343.3 R 7 Claims

1. A process for preparing a bicyclic γ-lactone represented by the formula (I)



(I)

wherein R represents a hydrogen atom or a straight or branched chain alkyl group having 1 to 4 carbon atoms and *n* is an integer of 1 to 6, which comprises condensing a cycloalkene diol compound represented by the formula (II)



(II)

wherein *n* is as defined above, with an orthocarboxylic acid ester represented by the formula (III)

(III)

wherein R is as defined above and R^1 represents a straight or branched chain alkyl group having 1 to 4 carbon atoms, in the presence of an acidic catalyst at a temperature of about 120°C to about 170°C in a molar ratio of about 1 to about 5 moles of said orthocarboxylic acid ester per mole of said cycloalkene diol compound.

3,970,674

CERTAIN HEXAHYDRO-2-LOWERALKOXY-5-OXYCYCLOPENTA [b] FURANS CONTAINING AN OLEFINIC SUBSTITUENT IN THE 4-POSITION

Hans Johann Mayer, Fullinsdorf; Albert Eduard Fischli, Basel, both of Switzerland; Michael Josef Klaus, Weil am Rhein, Germany, and Alexander Eduard Wick, Riehen, Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

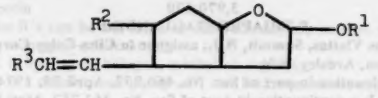
Division of Ser. No. 374,850, June 9, 1973, abandoned. This application Sept. 10, 1975, Ser. No. 612,068

Claims priority, application Switzerland, July 6, 1972, 10120/72

Int. Cl.² C07D *307/93*

U.S. Cl. 260—346.2 R 5 Claims

1. A compound of the formula:



wherein R^1 is lower alkyl; R^2 is selected from the group consisting of hydroxy, tetrahydro-pyranyloxy, 4-methoxy-5,6-dihydro-2-H-pyranyloxy, benzyloxy, trityloxy, benzhydryloxy, alphaloweralkoxyloweralkoxy, trimethylsilyloxy, and hydroxy-protected as its ester, said ester being hydrolyzable and derived from phosphoric acid,
lower alkanoic acid,
aryl lower alkanoic acid,
carbonic acid,
and lower alkane dicarboxylic acid;
R^3 is hydrogen, an alkyl group of from 1–10 carbon atoms, a cycloalkyl group of 3–7 carbon atoms, an alkenyl group of from 2–10 carbon atoms, phenyl, (lower alkyl)-phenyl or nitrophenyl.

3,970,675

DISPERSE DYESTUFFS

Siegfried Dengler, Choex; Peter Loew, Munchenstein; Christian Zickendraht, Binningen, and Hansrudolf Schwander, Riehen, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

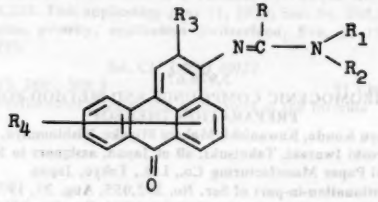
Filed June 17, 1974, Ser. No. 480,085

Claims priority, application Switzerland, June 29, 1973, 9503/73

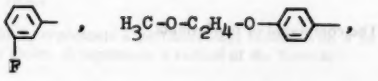
Int. Cl.² C09B *3/02*

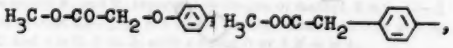
U.S. Cl. 260—364 10 Claims

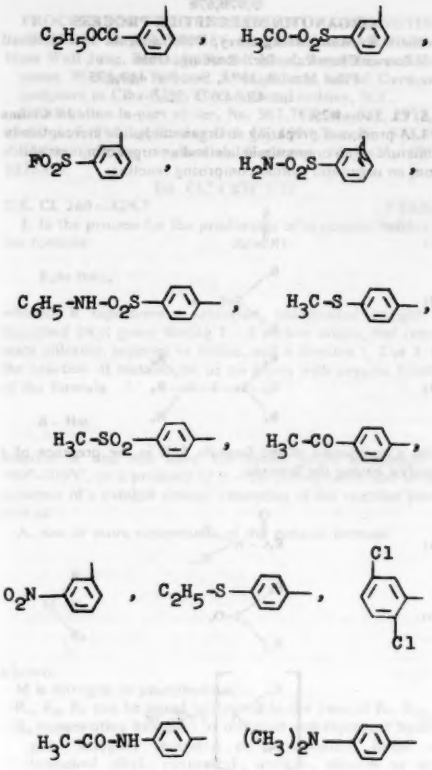
1. A dyestuff of the formula



wherein, R, R_1 and R_2 are C_1–C_{10}-alkyl, C_1–C_{10}-alkyl substituted by chlorine, hydroxy, phenyl, cyano, methoxy-C_1–C_2-alkanoyloxy or C_1–C_2-alkoxycarbonyl (cf page 2, bottom); cyclohexyl; phenyl or phenyl substituted by C_1–C_2-alkyl, C_1–C_2-alkoxy, chlorine, bromine, cyano, nitro or acetylamino; R is also a residue of the formulae $-C_{17}H_{35}$, $NC-CH_2-$, CH_3-O-CH_2-, $C_2H_5-O-CH_2-$, $CH_3-O-C_2H_4-$, $-CF_3$, $C_2H_5OOC-CH_2-CH_2-$, $NC-CH_2-CH_2-$, $(CH_3)_2N-CH_2-$, $CH_2=CH-$, $CH_3-CH=CH-$, $CH_2=C(CH_3)_2-$, $(C_2H_5)_2CH-$, $CH_3-CO-CH_2-$, $C_6H_5-CH_2-$, $C_6H_5-O-CH_2-$,







R_3 is hydrogen or an electron-negative organic radical with a positive sigma value in the Hammet equation; and R_4 represents a halogen atom, a lower alkyl group or represents hydrogen.

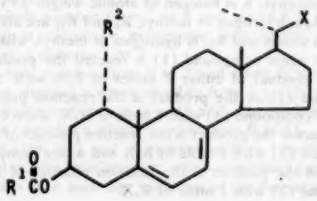
3,970,676

NOVEL PROCESS AND INTERMEDIATE COMPOUNDS USED IS PREPARATION OF -Δ5,7- STEROID DIENES

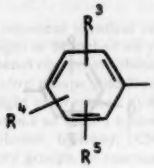
William G. Salmond, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed Oct. 29, 1974, Ser. No. 518,466
Int. Cl.[2] C07J 9/00
U.S. Cl. 260—397.2 31 Claims

1. A process for preparing compounds of the formula



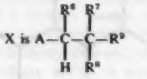
wherein R^1 is selected from alkyl of one to five carbon atoms, inclusive, and



wherein R^3, R^4, and R^5 are the same or different and are selected from the group consisting of hydrogen, alkyl of one to four carbon atoms, inclusive, alkoxy of one to four carbon atoms, inclusive, and halogen;

R^2 is selected from the group consisting of hydrogen and

R^1 defined as above;



wherein A is $-CH_2-CH_2-$,

R^6, R^7, R^8 are the same or different and are hydrogen or methyl;

R^9 is selected from the group consisting of hydrogen, hydroxy, and

R^1 as defined above, with the proviso that when R^9 is hydrogen, A is $-CH_2-CH_2$, R^6 is hydrogen and R^7 and R^8 are methyl; and

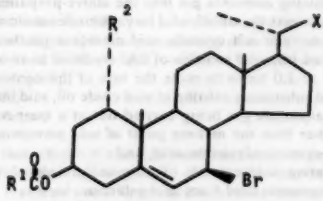
when R^9 is hydroxy or

R^1 defined as above, and R^7 and R^8 are hydrogen, then R^6 is hydrogen;

when R^9 is hydroxy or

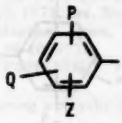
R^7 is hydrogen or methyl, and R^8 is methyl, then R^6 is hydrogen or methyl, which comprises

a. epimerizing a 7β-bromo steroid of the formula



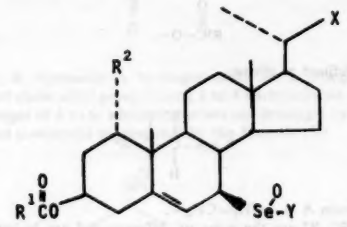
wherein R^1, R^2 and X are defined as above, to the 7α-bromo compound,

b. reacting the 7α-bromo compound with Y selenolate wherein Y is



with P, Q, and Z being the same or different and selected from the group consisting of hydrogen, alkyl of one to four carbon atoms, inclusive, alkoxy of one to four carbon atoms, inclusive, and halogen to form the 7β-selenide,

c. oxidizing the 7β-selenide to form compounds of the formula



wherein R^1, R^2, X and Y are as defined above,

d. decomposing the oxidized selenide of Step c to form a compound of the preamble.

3,970,677

METHOD FOR ISOLATING 11-CYANO-UNDECANOIC ACID IN ITS AMMONIUM SALT

Kenji Nishimura; Shinichi Furusaki, and Kazuo Hashimoto, all of Ube, Japan, assignors to Ube Industries, Ltd., Tokyo, Japan

Filed Jan. 23, 1975, Ser. No. 543,445
Claims priority, application Japan, Feb. 1, 1974, 49-12717
Int. Cl.² C07C *121/407*
U.S. Cl. 260—404.5 **8 Claims**

1. A method for isolating 11-cyano-undecanoic acid in the form of its ammonium salt from a crude oil containing therein 11-cyano-undecanoic acid obtained by thermally cracking 1,1'-peroxy-dicyclohexyl amine at a temperature between 300° and 1080°C, comprising the steps of:

dissolving said crude oil into an organic solvent consisting of at least one aromatic hydrocarbon having 6 to 8 carbon atoms to prepare a solution containing 5 to 30% by weight of 11-cyano-undecanoic acid;

introducing ammonia gas into the above-prepared solution to convert the dissolved 11-cyano-undecanoic acid to its ammonium salt crystals, said ammonia gas being introduced into said solution of said crude oil in an amount of 0.5 to 2.0 times by mole the sum of the contents of the acid substances existing in said crude oil, said introducing of ammonia gas being carried out at a temperature not higher than the melting point of said ammonium salt of 11-cyano-undecanoic acid; and

separating said crystals of ammonium salt of 11-cyano-undecanoic acid from said solution.

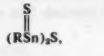
3,970,678

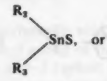
ORGANOTIN MERCAPTIDE PROCESS

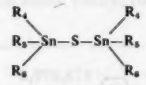
Kenneth R. Molt, Montgomery, Ohio, assignor to Cincinnati Milacron Chemicals, Inc., Reading, Ohio

Filed Mar. 8, 1974, Ser. No. 449,435
Int. Cl.² C07F *7/22*
U.S. Cl. 260—429.7 **19 Claims**

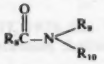
1. A process of preparing an organotin halide mercaptide or a mixture of an organotin halide and an organotin mercaptide from an organotin sulfide comprising reacting:

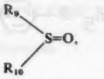
(1) 

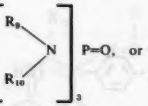
(2) 

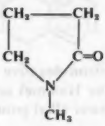
(3) 

with a compound of the formula R_1X in the presence of a catalyst having the formula:

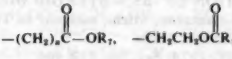
(a) 

(b) 

(c) 

(d) 

where R, R_2, R_3, R_4, R_5, and R_6 are alkyl, cycloalkyl, alkenyl, aryl or aralkyl, R_1 is



or benzyl, R_7 is alkyl, cycloalkyl, alkenyl, or aralkyl, R_{12} is alkyl or alkenyl, X is halogen of atomic weight 35 to 80, *n* is 1 or 2, R_8 is hydrogen or methyl, R_9 and R_{10} are alkyl of 1 to 2 carbon atoms and R_{11} is hydrogen or methyl, with the proviso that when compound (1) is reacted the product is the reaction product of either 2 moles of R_1X with 1 mole of compound (1) or the product is the reaction product of 3 moles of compound (1) with 1 mole of R_1X, when compound (2) is reacted the product is the reaction product of 1 mole of compound (2) with 1 mole of R_1X and where compound (3) is reacted the product is the reaction product of 1 mole of compound (3) with 1 mole of R_1X.

3,970,679

PROCESS FOR THE PRODUCTION OF ORGANOTIN HALIDES IN SULPHONES AS REACTION MEDIUM

Hans Wolf Jung, Burstadt; Rudolf Maul, Bensheim, and Hermann Wolfgang Wehner, Zwingenberg, all of Germany, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 362,701, May 22, 1973, abandoned. This application Oct. 10, 1974, Ser. No. 513,898

Claims priority, application Germany, May 25, 1972, 2225322

Int. Cl.[2] C07F 7/22

U.S. Cl. 260—429.7 **9 Claims**

1. In the process for the production of organotin halides of the formula

$$R_nSn\,Hal_{4-n}$$

wherein R represents a saturated, unsaturated straight or branched alkyl group having 1 – 4 carbon atoms, Hal represents chlorine, bromine or iodine, and *n* denotes 1, 2 or 3, by the reaction of metallic tin or tin alloys with organic halides of the formula

$$R - Hal$$

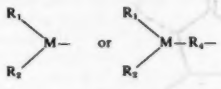
wherein R and Hal have the above given meanings, at 100°–300°C, at a pressure of 0 – 20 atmospheres and in the presence of a catalyst system, consisting of the reaction products of

A. one or more compounds of the general formula

wherein

M is nitrogen or phosphorous,

R_1, R_2, R_3 can be equal (excepted in the case of R_1, R_2, R_3 representing halogen) or different and represent hydrogen, halogen, saturated or unsaturated, linear or branched alkyl-, cycloalkyl-, aralkyl-, alkaryl- or aryl groups, optionally containing one or more functional groups, or represents the groups



wherein R_4 is an alkylene group having from 1 to 8 carbon atoms and more of the groups R_1, R_2 and R_3 can form a ring or ring system, which can contain oxygen, including corresponding onium-compounds, and

B. one or more compounds of the formula

$$E_aX_bY_c$$

wherein

E is borine, silicon, titanium, vanadium, chromium, manganese, iron, cobalt, nickel or copper,

X is a one- or more valent electronegative group,

Y is molecular ligand, which is fully or partially bonded in the coordination sphere of E,

a is a whole number from 1 to 4 and, when E is titanium, vanadium, chromium, manganese, iron, cobalt, nickel or copper, *a* denotes 1 or 2,

b is a whole number from 0 to 7 and when E is silicon or borine, denotes a whole number from 1 to 13,

c is a whole number from 0 to 18 and, when E is borine or silicon, denotes a whole number from 0 to 11,

in a molar ratio of 1 mol of compound B to 1 to 10 mol of compound A, the improvement which comprises performing said reaction in at least one sulphone of the formulae

wherein R_1 and R_2 represent identical or different, saturated or unsaturated, straight or branched alkyl groups having 1 - 4 carbon atoms, or phenyl or phenyl substituted by one or more methyl, halogen or nitro groups, and X represents a saturated or unsaturated, straight or branched hydrocarbon chain having 4 – 10 carbon atoms or such a hydrocarbon chain which is substituted by chlorine, hydroxy, $(CH_3)_2N$-, acetoxy, sulpholanyloxy or alkoxy groups, as reaction medium.

3,970,680

STORAGE-STABLE DIISOCYANATE COMPOSITIONS

John Murray Holland, Manchester, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Jan. 4, 1974, Ser. No. 432,391

Int. Cl.[2] C07C 119/048

U.S. Cl. 260—453 SP **3 Claims**

1. A storage stable composition comprising a diphenylmethane diisocyanate and a tertiary amine, said tertiary amine being present in an amount of not more than two equivalents for each equivalent of hydrolyzable chlorine in said diisocyanate, wherein said tertiary amine is triethylamine, didecyl methylamine, didodecylmethylamine, N-methyl piperidine, benzyl diethylamine, tripropylamine, tributylamine, N:N-dimethyl benzylamine, N:N'-dimethyl piperazine NN'-dilauryl piperazine, p-methyl-NN-diethyl benzylamine, p-dodecyl-N:N-diethyl benzylamine, N-methyl morpholine, N-dodecyl morpholine, N:N-dimethyl-t-butylamine, N:N-dimethyl-t-octylamine, N-methyl-1:1:3:5:5-pentamethyl piperidine, NN-diisopropyl dodecyl amine, NN'-distearyl piperazine, 1:4-diaza-(2:2:2)-bicyclooctane, N,N-dimethyl ethylamine, or N,N-dimethyldodecylamine.

3,970,681

NITRILE TERMINATED AROMATIC POLYETHERS

Carl Shipp Marvel, Tucson, Ariz., and Jozef Verborgt, Brussels, Belgium, assignors to University Patents, Inc., Stamford, Conn.

Continuation-in-part of Ser. No. 233,724, March 10, 1972, abandoned. This application Aug. 27, 1974, Ser. No. 501,098

Int. Cl.[2] C07C 121/75, 121/76

U.S. Cl. 260—465 F **14 Claims**

1. Low melting aromatic polyethers having the structural formula:

$$(NC-AR-CO)_n\{AR_1-O\{AR_1-O\}_nAR_1-Z\}_x$$
$$AR_1\{O-AR_1\}_mO-AR_1\{CO-AR-CN)_n$$

wherein:

AR and AR_1 are the same or different and are arylene groups:

Z is the same or different in each recurring unit and is selected from the group consisting of — OC — AR_3 — CO — and —SO_2 — AR_3 — SO_2 — wherein AR_3 is an arylene group;

x is 1–40;

m is 0–4, and

n is 0 or 1,

provided that when $n = o$, *x* is at least 3 and at least three AR_3 groups are cyanoarylene groups; and further provided that when n is 1, at least one AR_3 group is a cyanoarylene group.

3,970,682

NOVEL CYCLOPENTANONE ODORIFEROUS AGENT

Marcel Plattier, Antibes, and Paul José Teisseire, Grasse, both of France, assignors to Societe Anonyme Roure Bertrand DuPont, Paris, France

Filed Jan. 11, 1973, Ser. No. 322,748

Claims priority, application France, Jan. 18, 1972, 72.01510

Int. Cl.[2] C07C *69/74*

U.S. Cl. 260—468 K 3 Claims

1. Methyl [2-n-propyl-3-keto-cyclopent-1-yl]-acetate.

3,970,683

11,15-DIHYDROXY-9-OXOPROST-13-YNOIC ACID

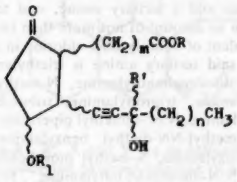
Paul W. Collins, Wheeling, and Raphael Pappo, Skokie, both of Ill., assignors to G. D. Searle & Co., Chicago, Ill.

Division of Ser. No. 244,238, April 14, 1972, abandoned, which is a continuation-in-part of Ser. No. 223,299, Feb. 3, 1972. This application Nov. 12, 1974, Ser. No. 523,169

Int. Cl.[2] C07L *61/38, 69/74*

U.S. Cl. 260—468 D 9 Claims

1. A compound of the formula



wherein R is hydrogen or a lower alkyl radical containing 1 to 7 carbon atoms, R′ is hydrogen or a lower alkyl radical containing 1 to 4 carbon atoms, R_1 is hydrogen or a lower alkanoyl radical containing 1 to 7 carbon atoms, *m* is an integer greater than 5 and less than 8, *n* is an integer greater than 1 and less than 6 and the wavy lines represent the α or β configuration or the epimeric mixture.

3,970,684

POLYUNSATURATED PROSTAGLANDIN DERIVATIVES

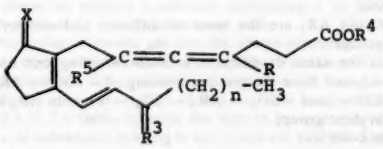
Pierre Crabbé, Grenoble, France; John H. Fried, Palo Alto, Calif., and Angel Guzman, Mexico City, Mexico, assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Division of Ser. No. 377,106, July 6, 1973, Pat. No. 3,873,598. This application July 15, 1974, Ser. No. 488,595

Int. Cl.[2] C07C *61/38, 69/74*

U.S. Cl. 260—468 D 19 Claims

1. A racemic compound selected from the group of those represented by the following formula:



wherein X is a keto group;

each of R and R^5 is hydrogen, methyl, ethyl or propyl;

R^3 is the grouping

in which R^1 is hydrogen, tetrahydrofuran-2-yloxy, tetrahydropyran-2-yloxy, 4-methoxytetrahydropyran-4-yloxy, a hydrocarbon carboxylic acyloxy group containing from 1 to 12 carbon atoms or a substituted hydrocarbon carboxylic acyloxy group having from 1 to 12 carbon atoms wherein the substituent is selected from the group consisting of hydroxy, alkoxy containing up to twelve carbon atoms, nitro, amino and halogen, or the grouping

in which R^6 is methyl, ethyl or propyl;

R^4 is hydrogen, a lower alkyl group of 1 to 3 carbon atoms or the pharmaceutically acceptable, non-toxic salts of compounds in which

R^4 is hydrogen;

n is an integer of from 2 to 9;

and the wavy lines indicate the α or β configuration or mixtures thereof;

provided that when R^6 is α the hydroxyl group, attached to the same carbon atom as R^6, is β; and when R^6 is β the hydroxyl group, attached to the same carbon atom as R^6, is α.

3,970,685

(dl)-13-SUBSTITUTED SULFINYL-PROSTAGLANDIN-LIKE COMPOUNDS

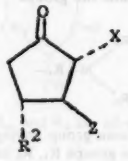
Karl G. Untch, Los Altos, Calif., and Gilbert J. Stork, New York, N.Y., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Filed June 5, 1974, Ser. No. 476,362

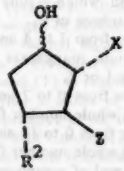
Int. Cl.[2] C07C *147/14*

U.S. Cl. 260—470 15 Claims

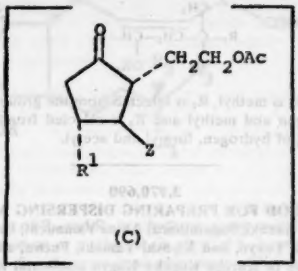
1. A compound selected from those of the formulas:



(A)



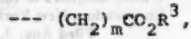
(B)



(C)

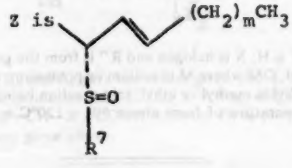
wherein

X is or

 ,

in which

R^3 is hydrogen or alkyl containing from one through three carbon atoms, and m is a whole integer from two through eight;

Z is 

wherein R^7 is phenyl, p-tolyl, p-chlorophenyl, p-fluorophenyl, 2,4-dichlorophenyl, or 2,5-dichlorophenyl, and m is defined as above; and

the wavy line (ξ) represents the α or β configuration or mixtures thereof; or a non-toxic, pharmaceutically acceptable salt of a compound of Formula (A) or (B) when R^3 is hydrogen.

3,970,686

5-(1,2,3,4-TETRAHYDRO-6-METHOXY-2-NAPHTHYL)-2-HYDROXY-1-METHYLCYCLOPENTANEETHANOLS AND ESTERS

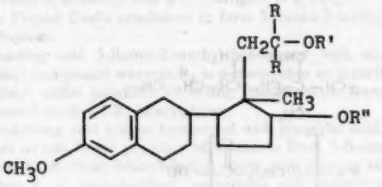
John H. Dygos, Northbrook, Ill., assignor to G. D. Searle & Co., Chicago, Ill.

Continuation of Ser. No. 464,826, April 29, 1974, Pat. No. 3,907,905. This application Mar. 31, 1975, Ser. No. 563,566

Int. Cl.² C07C *69/16, 69/28, 69/78*

U.S. Cl. 260—476 C **7 Claims**

1. A compound of the formula



wherein R represents hydrogen or methyl; R′ represents hydrogen when R represents methyl, otherwise R′ represents hydrogen, lower alkanoyl, or benzoyl; R″ represents hydrogen, or lower alkanoyl, or benzoyl; and R′ and R″ do not simultaneously represent hydrogen.

3,970,687

POLYESTERS WITH SUBSTITUTED AMINE END GROUPS

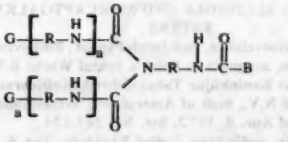
Robert A. Braun, Rochester, N.Y., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. Nos. 776,823, Nov. 18, 1968, abandoned, and Ser. No. 120,769, March 3, 1971, Pat. No. 3,684,771, and Ser. No. 241,402, April 5, 1972, abandoned. This application Dec. 10, 1973, Ser. No. 423,015

Int. Cl.² C07C *125/06*

U.S. Cl. 260—482 C **3 Claims**

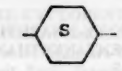
1. A polymeric material of the formula

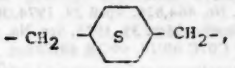


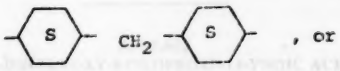
wherein

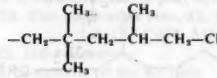
G is an amine, hydroxyamine, or mercapto-substituted amine;

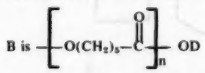
R is an alkylene of 2–36 carbon atoms,











wherein n=10–200, and
D is an alkyl of 3–10 C;
and
a is 1, 2, or 3.

3,970,688

SYNTHETIC HORMONES FOR INSECT CONTROL

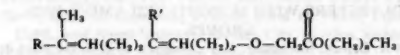
William S. Bowers, Bowie, Md., assignor to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Division of Ser. No. 363,294, May 23, 1973, which is a division of Ser. No. 78,577, Oct. 6, 1970, abandoned. This application July 2, 1975, Ser. No. 592,682

Int. Cl.² C07C *59/22*

U.S. Cl. 260—484 R **2 Claims**

1. A compound of the general formula



wherein R and R′ are selected from the group consisting of methyl and ethyl; x is a number from 1 to 2; and n is a number from 0 to 3.

3,970,689

MERCAPTO ALCOHOLS AND MERCAPTOALKYL ESTERS

Jan Stoffelsma, Hoevelaken, and Jacob Pypker, Bilthoven, both of Netherlands, assignors to Polak's Frutal Works B.V. and Douwe Egberts Koninklijke Tabaksfabriek-Koffiebranderij-en-Theehandel N.V., both of Amersfoort, Netherlands

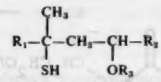
Filed Apr. 4, 1973, Ser. No. 347,624

Claims priority, application United Kingdom, Apr. 6, 1972, 15807/72

Int. Cl.² C07C *148/00, 149/14, 149/18*

U.S. Cl. 260—488 F **9 Claims**

1. Compounds having the formula:



wherein R_1 is methyl, R_2 is selected from the group consisting of hydrogen and methyl and R_3 is selected from the group consisting of hydrogen, formyl and acetyl.

3,970,690

METHOD FOR PREPARING DISPERSING AGENT

Shigeyuki Suzuki, Sagamihara; Akira Yamauchi, Urawa; Shoji Kiyama, Tokyo, and Kiyoshi Yamaki, Fuchu, all of Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Continuation-in-part of Ser. No. 168,495, Aug. 2, 1971, abandoned. This application Feb. 27, 1974, Ser. No. 446,224

Int. Cl.² C07C *143/24*

U.S. Cl. 260—505 C **1 Claim**

1. A dispersant composition which comprises a water-soluble alkali sulfonate of a pitch, said pitch
   1. being an aromatic mixture containing at least 80% thereof of a component predominantly having a fused-ring molecular structure of at least three rings and having an average molecular weight of from 500 to 2,000,
   2. having a carbon content of at least 90% based on elemental analysis, a hydrogen to carbon atomic ratio of 0.35 to 1.0 and a softening temperature of at least 150°C, and
   3. containing less than about 20% of a fraction insoluble in nitrobenzene, said alkali being selected from the group consisting of sodium, potassium, calcium and ammonium.

3,970,691

ETHERIFICATION OF BARK EXTRACTS

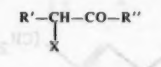
Karl David Sears, and Ronald Leroy Casebier, both of Shelton, Wash., assignors to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Aug. 3, 1972, Ser. No. 277,521

Int. Cl.² C07C *143/52, 69/76*

U.S. Cl. 260—507 R **2 Claims**

1. Water soluble etherified polyphenolic derivatives of coniferous tree barks produced by reacting a polyphenolic extract of a coniferous tree bark, said extract being sulfonated with a salt selected from the group consisting of ammonium, sodium and potassium salts of sulfurous acid, in the proportion of about 0.1 to 8.0 moles per mole of monomeric unit in the polyphenol with a halocompound of the formula



where R′ is H; X is halogen and R″ is from the group consisting of OH, OM where M is sodium or potassium, and oxyalkyl where alkyl is methyl or ethyl; said reaction being carried out at a temperature of from about 50° – 120°C in an alkaline solution.

3,970,692

PROCESS FOR THE PREPARATION OF PROSTAGLANDIN $F_2\alpha$ AND THE ANALOGS THEREOF

Bernd Radüchel; Werner Skuballa, and Helmut Vorbrüggen, all of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin & Bergkamen, Germany

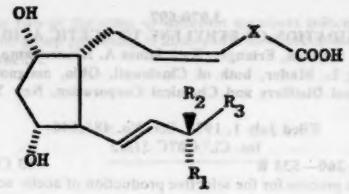
Filed May 23, 1974, Ser. No. 472,737

Claims priority, application Germany, May 30, 1973, 2328131

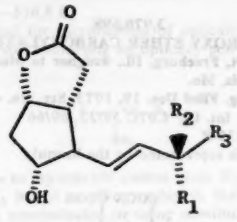
Int. Cl.² C07C *177/00*

U.S. Cl. 260—514 D **10 Claims**

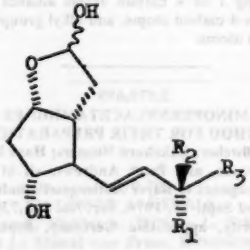
1. In a process for the production of prostaglandin F_2 and analogs thereof of the formula



wherein one of R_1 and R_2 is a hydroxy group and the other is a hydrogen atom or methyl, R_3 is alkyl of 5–7 carbon atoms, alkoxy of 3–5 carbon atoms or phenoxy and X is alkylene of 1–8 carbon atoms or alkyleneoxyalkylene of 2–5 carbon atoms, from a 3-ester of an aliphatic carboxylic acid of 1–12 carbon atoms or an aromatic carboxylic acid of 7–15 carbon atoms and with 1–2 separate or fused rings and of a lactone of the general formula



wherein R_1, R_2 and R_3 have the values given above, the improvement which comprises treating the lactone monoester with an excess of diisobutylaluminum hydride at −100° to 0° C., to produce a lactol of the formula



wherein R_1, R_2 and R_3 have the values given above, and reacting the thus-produced lactol with a Wittig reagent of the formula $Ph_3P{=}CH{-}X{-}COOH$ wherein Ph is phenyl and X has the values given above.

3,970,693

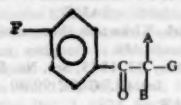
PROCESS FOR PREPARING INDENE ACETIC ACIDS

Roger J. Tull, Metuchen; Robert F. Czaja, Scotch Plains; Richard F. Shuman, Westfield, and Seemon H. Pines, Murray Hill, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed July 5, 1974, Ser. No. 486,031
Int. Cl.² C07C *147/14*
U.S. Cl. 260—515 A **18 Claims**

1. A process for preparing 5-fluoro-2-methyl-1-(p-methylsulfinylbenzylidene)-indene-3-acetic acid or its salt which comprises the steps of:

a. reacting a ketone of the formula:



wherein:
A is methyl or together with G forms methylidene;
B is hydrogen, methyl or halo (Cl, Br, F, I);
G is methyl, CH_2R or together with A forms methylidene, wherein R is halo (Cl, Br, F, I), hydroxy, its ethers or esters or $-N-(C_{1-5}\ alkyl)_2$; and
1. when A and G together is methylidene, B is methyl;
2. when A and G are each methyl, B is halo; and
3. when A is methyl and B is hydrogen, G is CH_2R;
under Friedel Crafts conditions to form 5-fluoro-2-methyl-1-indanone;

b. reacting said 5-fluoro-2-methyl-1-indanone with an R_1 benzyl compound wherein R_1 is p-methylthio or p-methylsulfinyl under Grignard or Wittig conditions to form 5-fluoro-2-methyl-1-R_1-benzylidene;

c. condensing said indene compound with glyoxylic acid, its ester or salt in the presence of a base to form 5-fluoro-2-methyl-1-R_1-benzylidenylidene-3-acetic acid ester or salt;

d. when R_1 is methylsulfinyl, isomerizing said indenylidene compound from step (c) with an acid or a base to form the desired product; or

e. when R_1 is methylthio, isomerizing said indenylidene compound from Step (c) with an acid or a base and subsequently oxidizing to form the desired product; or first oxidizing the product from Step (c) and subsequently isomerizing.

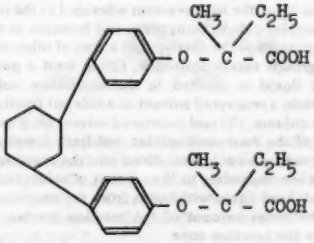
3,970,694

CYCLOALKYL PHENOXY CARBOXYLIC ACID DERIVATIVES

Masayoshi Minai, Moriyama; Yoshio Suzuki, Itami; Noritaka Hamma, Sakai; Eiichi Murayama, Takarazuka, and Shunji Aono, Toyonaka, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed June 28, 1974, Ser. No. 484,063
Claims priority, application Japan, July 2, 1973, 48-75031
Int. Cl.² C07C *63/33*
U.S. Cl. 260—520 C **5 Claims**

1. A compound of the formula,



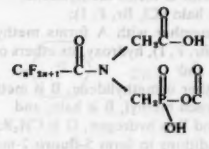
3,970,695

N-(PERFLUOROACYL)-N-PHOSPHONOMETHYL GLYCINE COMPOUNDS, METHOD OF PREPARING SAME

Melvin L. Rueppel, Kirkwood, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed May 23, 1975, Ser. No. 580,252
Int. Cl.² C07C 99/00
U.S. Cl. 260—534 R 4 Claims

1. A process for producing a compound of the formula



wherein *n* is an integer of from 1 to 4 which comprises forming an admixture of N-phosphonomethyl glycine and a perfluoroalkanoic acid and then adding thereto a perfluoroalkanoic acid anhydride of the formula

wherein *n* has the above-defined meaning and maintaining the resulting admixture at a temperature at which the anhydride and the N-phosphonomethyl glycine react to produce said compound.

3,970,696

PROCESS FOR PRODUCING AROMATIC CARBOXYLIC ACID

Motoo Shigeyasu, and Michio Kuki, both of Matsuyama, Japan, assignors to Matsuyama Petrochemicals Inc., Osaka, Japan

Filed July 29, 1974, Ser. No. 492,796
Claims priority, application Japan, July 28, 1973, 48-85215
Int. Cl.² C07C 51/33
U.S. Cl. 260—524 R 10 Claims

1. In a process for producing terephthalic acid comprising liquid phase oxidizing in a reaction zone p-xylene with a molecular oxygen-containing gas in a lower aliphatic carboxylic acid solvent in the presence of an oxidation catalyst containing a heavy metal compound and a bromine compound, withdrawing from the reaction system a condensed liquid obtained by condensing a gaseous mixture discharged from the top of the reaction zone during the reaction, said condensed liquid mainly comprising the lower aliphatic carboxylic acid solvent and water formed in the reaction, distilling off water from the condensed liquid thus withdrawn in a distillation column to recover the lower aliphatic carboxylic acid solvent, introducing the recovered solvent into the reaction zone to thereby maintain the water content of the reaction system below 20% by weight and recycling to the reaction zone the reaction mother liquor as it is, said reaction mother liquor being from the reaction zone, the improvement wherein (1) the oxidation catalyst contains cobalt, manganese and bromine as the inorganic components of the catalyst and is free of other inorganic atoms or groups except hydrogen, (2) at least a part of the condensed liquid is distilled in the distillation column to thereby obtain a recovered solvent as a side cut fraction of the distillation column, (3) said recovered solvent or, if necessary, a mixture of the recovered solvent and fresh lower aliphatic carboxylic acid solvent is introduced into the reaction zone in an amount corresponding to the amount of solvent contained in the condensed liquid withdrawn from the reaction system, and (4) the entire amount of the reaction mother liquid is recycled to the reaction zone.

3,970,697

OXIDATION OF ETHYLENE TO ACETIC ACID

John A. Scheben, Erlanger, Ky.; James A. Hinnenkamp, and Irving L. Mador, both of Cincinnati, Ohio, assignors to National Distillers and Chemical Corporation, New York, N.Y.

Filed July 1, 1974, Ser. No. 485,046
Int. Cl.² C07C 51/32
U.S. Cl. 260—533 R 13 Claims

1. In a process for the selective production of acetic acid by reacting ethylene and oxygen with added water in the feed over a supported catalyst consisting essentially of palladium metal or palladium metal and gold metal in a catalytically effective amount, the improvement which comprises conducting the process in the presence of a sulfur containing catalyst modifier having 2–4 atoms of oxygen per sulfur atom wherein the sulfur modifier is sulfur dioxide, sulfur trioxide, sulfurous acid, sulfuric acid, a sulfonic acid, or a salt of said acids and said sulfur modifier is impregnated in the catalyst support in an amount of about 0.05–25% by weight of the supported catalyst.

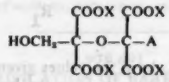
3,970,698

HYDROXY ETHER CARBOXYLATES

Kent P. Lannert, Freeburg, Ill., assignor to Monsanto Company, St. Louis, Mo.

No Drawing. Filed Dec. 19, 1973, Ser. No. 426,296
Int. Cl.² C07C 59/22, 69/66
U.S. Cl. 260—535 P 3 Claims

1. Compounds represented by the formula



wherein A is selected from the group consisting of hydrogen, methyl, ethyl and —CH_2OH and X is selected from the group consisting of hydrogen, alkali metal, ammonium, alkyl ammonium containing 1 to 4 carbon atoms alkanol ammonium containing 1 to 4 carbon atoms, and alkyl groups containing 1 to 20 carbon atoms.

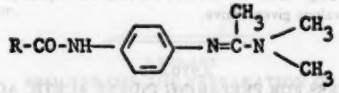
3,970,699

4-ACYLAMINOPHENYLACETAMIDINES AND A METHOD FOR THEIR PREPARATION

Hartmund Wollweber; Ekkehard Niemers; Hans Peter Schulz; Herbert Thomas, and Peter Andrews, all of Wuppertal, Germany, assignors to Bayer Aktiengesellschaft, Germany

Filed Sept. 13, 1974, Ser. No. 505,738
Claims priority, application Germany, Sept. 18, 1973, 2346939
Int. Cl.² C07C 103/34
U.S. Cl. 260—562 R 27 Claims

1. A compound of the formula:



or a pharmaceutically acceptable non-toxic salt thereof wherein

R is straight or branched chain alkoxyalkyl having 3 to 8 carbon atoms, either unsubstituted or substituted in the alkoxy moiety by one or two of the same or different members selected from the group consisting of alkoxy of 1 to 4 carbon atoms and phenyl; or straight or branched chain alkenyloxyalkyl having 3 to 8 carbon atoms either unsubstituted or substituted in the alkoxy moiety by one

or two of the same or different members selected from the group consisting of alkoxy of 1 to 4 carbon atoms and phenyl.

3,970,700

RACEMIZATION OF OPTICALLY ACTIVE AMINES

Tsuneyuki Nagase, Takatsuk; Gohu Suzukamo, Ibaraki, and Yoshio Suzuki, Itami, all of Japan, assignors to Sumitomo Chemical Company, Limited, Japan

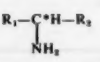
Filed Sept. 6, 1974, Ser. No. 503,691

Claims priority, application Japan, Sept. 7, 1973, 48-101418; Sept. 7, 1973, 48-101419; Sept. 7, 1973, 48-101420

Int. Cl.² C07C *20/00*

U.S. Cl. 260—570.8 R 9 Claims

1. A method for racemization of optically active amines which comprises contacting an optically active amine of the formula:



wherein C* is an asymmetric carbon atom, R_1 is alkyl, aralkyl or aryl C. R_2 is aryl or alkoxycarbonyl, the aryl or aralkyl moiety being unsubstituted or being substituted with one or more alkyl or alkoxy groups on the aromatic ring, provided that R_1 and R_2 are always different from each other, with an alkali metal catalyst selected from the group consisting of (1) an alkali metal deposited on a solid carrier, (2) an alkali metal dispersed in a liquid medium and (3) an alkali metal alloy at a temperature of from −10° to 50°C

3,970,701

LOWER ALKENALS

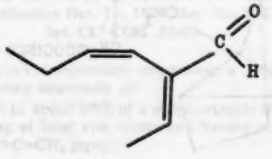
Anne Sanderson, Highlands; William L. Schreiber, Ocean, both of N.J.; Michel van Praac, Hilversum, Netherlands; Alan O. Pittet, and William J. Evers, both of Atlantic Highlands, N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Filed July 30, 1973, Ser. No. 383,578

Int. Cl.² C07C *47/20*

U.S. Cl. 260—601 R 1 Claim

1. A composition of matter consisting essentially of trans-2-ethylidene-cis-3-hexenal having the formula:



3,970,702

CATALYTIC PROCESS FOR THE PREPARATION OF ACROLEIN

Tatsuo Shiraishi; Susumu Kishiwada; Shinkichi Shimizu; Shigern Honmaru; Hiroshi Ichihashi, and Yoshihiko Nagaoka, all of Niihama, Japan, assignors to Sumitomo Chemical Company, Limited, Japan

Continuation of Ser. No. 159,306, July 2, 1971, abandoned. This application Dec. 3, 1974, Ser. No. 529,100

Claims priority, application Japan, July 3, 1970, 45-58503; July 6, 1970, 45-59298; July 8, 1970, 45-60042; Aug. 15, 1970, 45-71609; Sept. 11, 1970, 45-80174

Int. Cl.² C07C *45/04*

U.S. Cl. 260—604 R 11 Claims

1. A process for preparing acrolein by the vapor phase oxidation of propylene which comprises contacting propylene and oxygen with a catalyst composition consisting essentially of a catalyst system of the formula:

$$Mo_aBi_bFe_cX_dNi_eTl_fP_gO_h$$

wherein X is one or more of Mg, Mn and Co and *a*, *b*, *c*, *d*, *e*, *f*, *g* and *h* represent, respectively, the number of atoms and wherein *a* is 12, *b* is 0.1 to 5, *c* is 0.1 to 5, *d* is 0 to 12, *e* is 0.1 to 12, *f* is 1 or less but not less than a catalytic amount, *g* is 0 to 5 and *h* is a number determined by the valence requirements of the other atoms and is 36 to 89 at a temperature from 200° to 550°C. and at a space velocity of 100 to 12,000 liter.-gas/liter.catalyst/hr.

3,970,703

PHENYLACETIC ACID DERIVATIVES

Shigeyoshi Kitamura; Yositosi Okuno, both of Toyonaka, and Masachika Hirano, Minoo, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

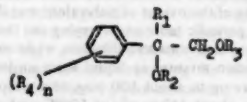
Division of Ser. No. 207,542, Dec. 13, 1971, Pat. No. 3,864,388. This application Dec. 17, 1974, Ser. No. 533,648

Claims priority, application Japan, Dec. 29, 1970, 45-124365

Int. Cl.² C07C *43/22*

U.S. Cl. 260—611 A 2 Claims

1. A compound of the formula,



wherein R_1 is a C_{1-6} alkyl, a C_{2-6} alkenyl, a C_{3-6} alkynyl, a C_{3-6} cycloalkyl or benzyl, R_2 is a C_{1-6} alkyl, a C_{3-6} alkenyl or a C_{3-6} alkynyl, R_3 is a C_{1-6} alkyl, a C_{3-6} alkenyl or a C_{3-6} alkynyl, (provided that R_2 is a C_{3-6} alkynyl when R_3 is a C_{1-6} alkyl), R_4 is hydrogen, halogen, a C_{1-4} alkyl or methylenedioxy, and n is an integer of 1 to 5.

3,970,704

ALKOXY SUBSTITUTED ALIPHATIC DI-OLEFINIC HALIDES

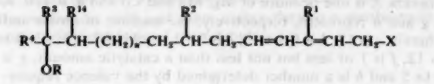
Clive A. Henrick, and John B. Siddall, both of Palo Alto, Calif., assignors to Zoecon Corporation, Palo Alto, Calif.

Division of Ser. No. 217,930, Jan. 14, 1972, Pat. No. 3,890,398, which is a continuation-in-part of Ser. No. 187,897, Oct. 8, 1971, Pat. No. 3,755,411, which is a continuation-in-part of Ser. No. 111,650, Feb. 1, 1971, Pat. No. 3,729,486, and a continuation-in-part of Ser. No. 111,702, Feb. 1, 1971, abandoned, and a continuation-in-part of Ser. No. 111,765, Feb. 1, 1971, abandoned, and a continuation-in-part of Ser. No. 111,766, Feb. 1, 1971, abandoned, and a continuation-in-part of Ser. No. 111,770, Feb. 1, 1971, abandoned, and a continuation-in-part of Ser. No. 115,725, Feb. 16, 1971, Pat. No. 3,706,733. This application Mar. 21, 1975, Ser. No. 560,851

Int. Cl.[2] C07C *43/00, 43/17*

U.S. Cl. 260—614 R 9 Claims

1. A compound selected from the following formula:



wherein,

n is zero or one;

R is lower alkyl;

each of R^1, R^2, R^3 and R^4 is methyl or ethyl; and

X is bromo, chloro, fluoro or iodo.

3,970,705

PREPARATION OF UNSATURATED ETHERS

Brian W. Taylor, and Harold E. Swift, both of Gibsonia, Pa., assignors to The B. F. Goodrich Company, Akron, Ohio

Continuation of Ser. No. 374,690, June 28, 1973, abandoned, which is a continuation-in-part of Ser. No. 228,268, Feb. 22, 1973, abandoned. This application Aug. 4, 1975, Ser. No. 603,147

Int. Cl.[2] C07C *41/06, 41/10*

U.S. Cl. 260—614 R 3 Claims

1. In a method of producing unsaturated ethers in which each of the organic groups attached to the ether oxygen atom contain one carbon-to-carbon double bond by the reaction of a mixture of an allylic halide with an unsaturated alcohol, the improvement which comprises dissolving in said mixture a copper I halide and adding to said mixture a solid acid-acceptor material insoluble in said mixture and selected from the class consisting of the oxides of polyvalent metals of groups 2a and 2b of the periodic table and carrying out the said reaction in the absence of solvents and diluents, while maintaining the resulting reaction mixture in liquid form under superatmospheric pressure up to about 100 psig, at a temperature in the range of from about 25° to about 100°C and while substantially excluding moisture and oxygen, said allylic halide ingredient being selected from the class consisting of allyl chloride, 3-chloro-1-butene or 1-chloro-2-butene, said alcohol ingredient being selected from the class consisting of allyl alcohol, 1-hydroxy-3-butene or 2-hydroxy-4-pentene, and said acid-acceptor material is present in a proportion at least equivalent on a molar basis to the said allylic halide ingredient.

3,970,706

PROCESS FOR SYNTHESIZING CIS-α-SANTALENE AND CIS-α-SANTALOL

Marc Julia, Paris, France, assignor to Agence Nationale de Valorisation de la Recherche (ANVAR), Neuilly-sur-Seine, France

Filed Aug. 22, 1973, Ser. No. 390,490

Claims priority, application France, Aug. 25, 1972, 72.30302

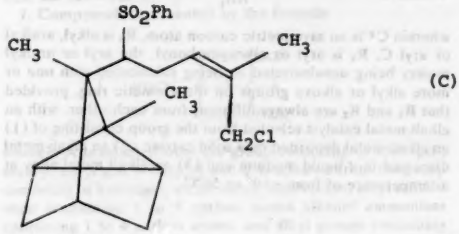
Int. Cl.[2] C07C *33/05, 147/08, 69/145*

U.S. Cl. 260—617 F 3 Claims

1. Process for the preparation of cis α-santalol comprising the following stages:

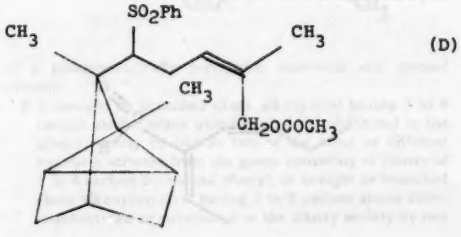
a. treating π-bromotricyclene with sodium benzene sulphinate in dimethylformamide to form the corresponding phenylsulphone;

b. treating the phenylsulphone obtained in stage (a) in presence of butyl lithium in a mixture of tetrahydrofuran/HMPT or THF/tetramethylethylene diamine with the cis 1, 4-dichloro-2-methyl-2-butene to form a compound corresponding to the following formula:



(C)

c. the compound (C) is treated with sodium acetate in dimethylformamide to form a compound corresponding to the following formula:



(D)

d. the compound obtained in stage (c) is treated with sodium amalgam to form the compound cis α-santalol.

3,970,707

METHOD FOR PREPARING 3,5,3′,5′-TETRABROMO-2,4,2′,4′-TETRAOXYDIPHENYL

Vasily Ivanovich Shvedov, ulitsa M. Ulyanovoi, 9, korpus 3, kv. 11; Alexei Nikolaevich Grinev, Belyaevo-Bogorodskoe, kvartal 44, korpus 9, kv. 57, and Evgenia Nikolaevna Sytina, 5 parkovaya ulitsa, 64, korpus 2, kv. 93, all of Moscow, U.S.S.R.

Filed Apr. 11, 1974, Ser. No. 460,104
Int. Cl.² C07C *37/00*
U.S. Cl. 260—620 **6 Claims**

1. A method which comprises reacting 2,4,2′,4′-tetramethoxydiphenyl with an acid agent selected from the group consisting of aluminium chloride, aluminium bromide, and hydrogen bromide in acetic acid in the presence of an organic solvent at a temperature up to 120°C, separating 2,4,2′,4′-tetraoxydiphenyl from the reaction mixture and reacting the separated product with bromine in the presence of an organic solvent to form 3,5,3′,5′-tetrabromo-2,4,2′,4′-tetraoxydiphenyl, and recovering the end product.

3,970,708

PROCESS FOR REMOVING ALUMINUM PHENOXIDE CATALYST FROM PHENOL ALKYLATION PRODUCTS

Kiyoshi Katsumoto, El Cerrito, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Dec. 26, 1974, Ser. No. 536,500
Int. Cl.² C07C *39/06*
U.S. Cl. 260—624 C **3 Claims**

1. In a process for removing aluminum phenoxide catalyst from ortho-alkylphenols produced by the reaction of phenol with an olefin in the presence of aluminum phenoxide catalyst wherein the catalyst is removed at the termination of the reaction by the addition of from 3 to 12 mols of water per atom of aluminum to the reaction product at a temperature of from about 0° to 230°C to form a precipitate followed by filtration of the precipitate from the reaction product mixture the improvement which comprises adding from about 0.05 to 5.0 parts of a neutral monomeric inorganic salt of a polyvalent anion and an alkali metal or ammonium cation selected from the group consisting of sulfates, silicates, phosphates, and carbonates to said mixture prior to filtration.

3,970,709

ADHESIVE FORMULATIONS FOR BONDED METAL ASSEMBLIES WITH RESISTANCE TO AGGRESSIVE ENVIRONMENTS

William J. Owston, Edinboro, Pa., assignor to Lord Corporation, Erie, Pa.

Continuation of Ser. No. 298,352, Oct. 17, 1972, abandoned. This application Dec. 11, 1974, Ser. No. 531,654
Int. Cl.² C08L *83/06*
U.S. Cl. 260—827 **10 Claims**

1. An adhesive composition comprising a polymerizable mixture consisting essentially of:

A. about 75 to about 99% of a polymerizable liquid resin comprising at least one compound having at least one terminal $>C=CH_2$ group;

B. about 0.5 to about 15% of ethylenically unsaturated carboxylic acid; and

C. about 0.5 to about 10% of an organosilicon compound represented by the formula $X_3Si(CH_2)_mY$ in which m is an integer from 0 to 3, Y is an organo-functional group and X is a group selected from the group consisting of hydrolyzable groups and hydrolyzed groups.

3,970,710

PROCESS FOR MAKING TRIFLUOROETHANOL

Stephen Wolownik, Waukegan, Ill., assignor to Abbott Laboratories, North Chicago, Ill.

Filed Apr. 9, 1975, Ser. No. 566,553
Int. Cl.² C07C *31/34*
U.S. Cl. 260—633 **4 Claims**

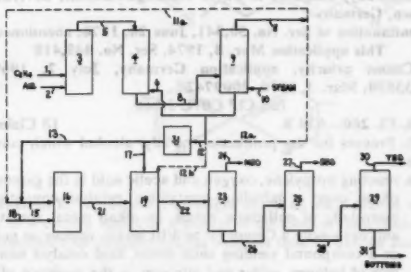
1. The process of preparing 2,2,2-trifluoroethanol comprising the single step of heating a mixture of trifluoroacetyl chloride and hydrogen in the presence of palladium supported by alumina at a temperature of 100°–300° C. and condensing the formed 2,2,2 - trifluoroethanol at a temperature below its boiling point.

3,970,711

METHOD OF PRODUCING GLYCOLS

Charles Ronald Reiche, and Jerry A. Heckman, both of Beaumont, Tex., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed July 19, 1971, Ser. No. 163,579
Int. Cl.² C07C *29/00, 29/24*
U.S. Cl. 260—635 E **4 Claims**



1. In the process of producing ethylene glycol in an ethylene glycol reaction system by hydrolysis of ethylene oxide wherein ethylene oxide, which is produced by direct oxidation of ethylene, is absorbed in water in an absorbing vessel to form an ethylene oxide-water mixture, ethylene oxide is stripped from the ethylene oxide-water mixture in a stripping vessel, and ethylene glycol-containing water from the stripping vessel is recycled to the absorbing vessel, the improvement which comprises removing a portion of the ethylene glycol-containing water as a purge stream, improving the ultraviolet light transmittance of ethylene glycol-containing water purge stream by contacting it at a temperature of at least 80°F. with an adsorbent selected from the group consisting of carbon, silica, silica gel, alumina, Fuller's earth, porous glass and diatomaceous earth, forwarding ethylene glycol-containing water of improved ultraviolet light transmittance to the ethylene glycol reaction system and recovering ethylene glycol that is suitable for fiber manufacture from the ethylene glycol reaction system.

3,970,712

HYDROLYSIS OF OAT HUSKS

Hermann Friese, Berlin, Germany, assignor to Sud-Chemie AG, Munich, Germany

Filed Nov. 13, 1974, Ser. No. 523,456

Claims priority, application Germany, Nov. 23, 1973, 2358472

Int. Cl.² C07C 29/00; C07G 1/00; C13K 1/02, 13/00

U.S. Cl. 260—635 C 31 Claims

1. A process for the hydrolysis of oat husks which comprises:

a. hydrolyzing oat husks with a solvent containing at least one member selected from the group consisting of alkali metal hydroxide and alkali metal chlorite to provide oat husks from which the chemically bound acetic acid originally present therein has been substantially completely removed, and a solution of acetic acid;

b. recovering the oat husks from which the chemically bound acetic acid has been substantially removed; and

c. hydrolyzing the oat husks of step (b) with a mineral acid to provide a solid residue containing lignin and an acidic solution of D-(+)-xylose.

3,970,713

PROCESS FOR THE PRODUCTION OF ALLYL ALCOHOL

Gerhard Scharfe, Leverkusen; Wulf Schwerdtel, Cologne; Wolfgang Swodenk, Odenthal-Globusch; Bruno Engelhard, Cologne; Johann Grolig, Leverkusen; Manfred Martin, Cologne, and Karl-Hermann Reissinger, Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Continuation of Ser. No. 50,341, June 26, 1970, abandoned. This application Mar. 8, 1974, Ser. No. 449,418

Claims priority, application Germany, July 2, 1969, 1933538; Mar. 3, 1970, 2009742

Int. Cl.² C07C 29/00

U.S. Cl. 260—638 R 18 Claims

1. Process for the production of allyl alcohol which comprises

a. reacting propylene, oxygen and acetic acid in the gaseous phase over a palladium-containing catalyst consisting essentially of palladium metal, an alkali metal acetate, and optionally a Group IV to VIII metal, copper or gold or a compound yielding such metal, said catalyst being free of halogen, sulfur and nitrogen, in the presence of 5 to 20 moles of water per mole of acetic acid at temperatures of from 50° to 250°C.;

b. condensing the gaseous reaction product to form a condensate comprising allyl acetate, acetic acid and water;

c. treating said condensate with an acid cation exchanger catalyst in the liquid phase at temperatures of from 50° to 150°C. in an acid catalyst treatment stage; and

d. after removal of the catalyst, separating the reaction product obtained in a first distillation column into a first head product consisting essentially of a ternary azeotrope of allyl acetate, allyl alcohol and water, and into a first sump product consisting essentially of acetic acid, allyl alcohol and water;

e. recycling at least part of the first head product from said first distillation column to the said acid catalyst treatment stage;

f. separating the first sump product from said first distillation column in a second distillation column into a second head product, consisting essentially of the azeotrope of allyl alcohol and water, and into a second sump product consisting essentially of acetic acid and water;

g. recycling the second sump product to the initial reaction of propylene with oxygen and acetic acid; and

h. removing the allyl alcohol-water azeotrope.

3,970,714

HEAT-STABLE POLYIMIDE RESIN MODIFIED BY UNSATURATED POLYESTER

Michel Bargain, Lyon, France, assignor to Rhone-Poulenc S.A., Paris, France

Continuation-in-part of Ser. No. 228,232, Feb. 22, 1972. This application Mar. 5, 1974, Ser. No. 448,262

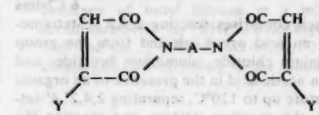
Claims priority, application France, Feb. 24, 1971, 71.06289

Int. Cl.² C08L 77/00

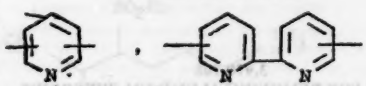
U.S. Cl. 260—857 PE 18 Claims

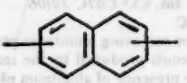
1. A heat-stable cured resin consisting essentially of a three-dimensional polyimide which is obtained by reacting at between about 50°C. and 350°C. at least one reactant from each of the following four groups:

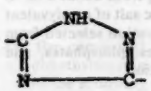
i. a bis-imide of the general formula:

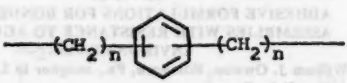


in which Y denotes H, CH_3 or Cl, and A represents a linear or branched alkylene radical having less than 13 carbon atoms, a phenylene or cyclohexylene radical or one of the radicals of formulae:

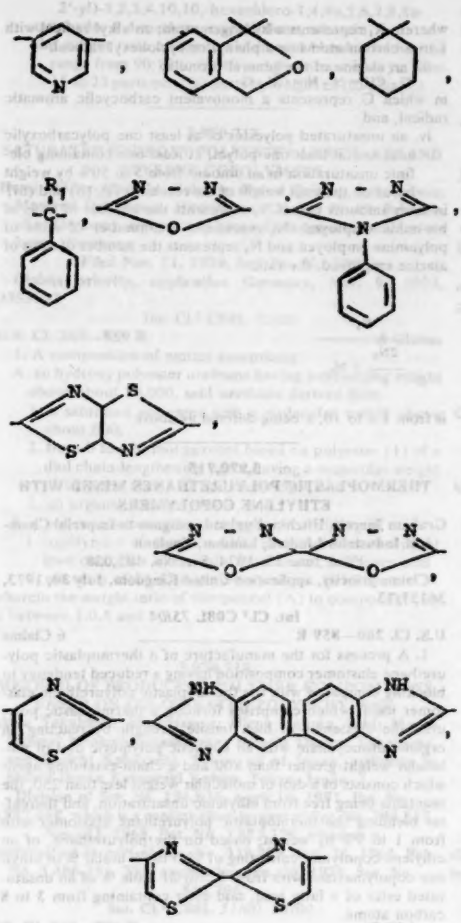








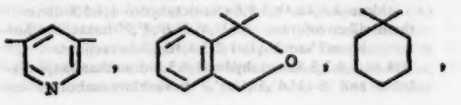
wherein *n* represents an integer from 1 to 3 or a divalent radical with 12 to 30 carbon atoms consisting of phenylene or cyclohexylene radicals bonded to one another by a simple valency bond or by —O—; —S—, an alkylene group with 1 to 3 carbon atoms, —CO—, $-SO_2-$, $-NR_1-$, —N=N—, —CONH—, —COO—, $-P(O)R_1-$, —CUN—x—NHCO—,

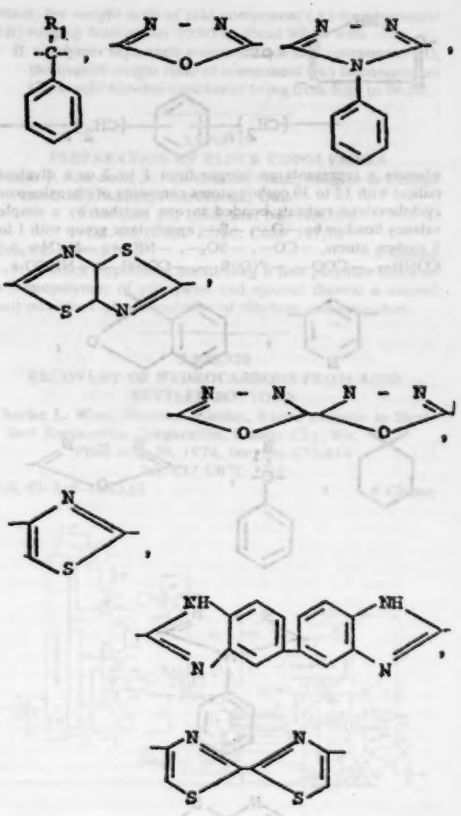


wherein R_1 represents a hydrogen atom, an alkyl radical with 1 to 4 carbon atoms or a phenyl or cyclohexyl radical and X represents an alkylene radical with less than 13 carbon atoms, a polyamine of the general formula:

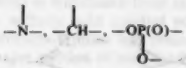
$$R(NH_2)_x$$

in which x represents an integer from 2 to 5 and R denotes an organic radical of valency x and selected from the group consisting of a 3 to 5 valent benzene, methylbenzene, naphthalene, pyridine or triazine radical, a 3 to 5 valent radical consisting of phenylene radials bonded to one another by a simple valency bond or by —O—, —S—, an alkylene group with 1 to 3 carbon atoms, —CO—, $-SO_2-$, $-NR_1-$, —N=N—, —CONH—, —COO—, $-P(O)R_1-$, —CONH-X-NHCO—

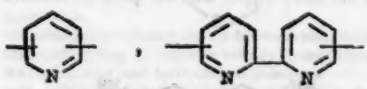


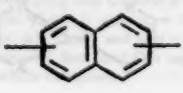


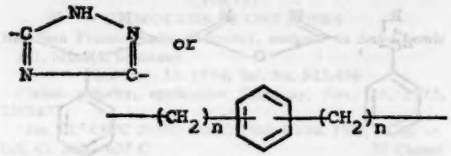
wherein R_1 represents a hydrogen atom, an alkyl radical with 1 to 4 carbon atoms or a phenyl or cyclohexyl radical and X represents an alkylene radical with less than 13 carbon atoms,



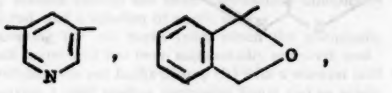
and —P(O)—; a linear or branched alkylene radical having less than 13 carbon atoms, a phenylene or cyclohexylene radical or one of the radicals of the formulae:

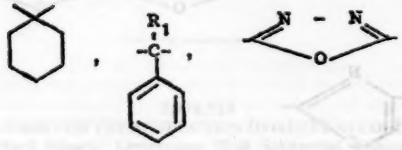


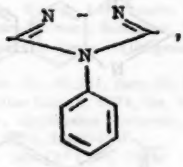


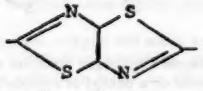


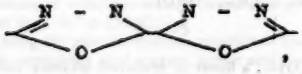
wherein *n* represents an integer from 1 to 3 or a divalent radical with 12 to 30 carbon atoms consisting of phenylene or cyclohexylene radicals bonded to one another by a simple valency bond or by —O—, —S—, an alkylene group with 1 to 3 carbon atoms, —CO—, —SO_2—, —NR_1—, —N<N—, —CONH—, —COO—, —P(O)R_1—, —CONH—X—NHCO—,

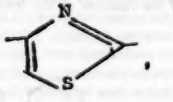


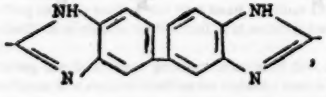












wherein R_1 represents a hydrogen atom, an alkyl radical with 1 to 4 carbon atoms or a phenyl or cyclohexyl radical;

iii. an alazine of the general formula:

G - CH = N - N = CH - G

in which G represents a monovalent carbocyclic aromatic radical, and

iv. an unsaturated polyester of at least one polycarboxylic acid and at least one polyol, at least one containing olefinic unsaturation in an amount from 5 to 50% by weight based on the total weight of the reactants (i), (ii) and (iii)

in such amounts that if N_1 represents the number of mols of bis-imide employed, N_2 represents the number of mols of polyamine employed and N_3 represents the number of mols of alazine employed, the ratio

$$\frac{N_1}{\frac{2N_2}{x} + N_3}$$

is from 1.5 to 10, *x* being defined as above.

3,970,715

THERMOPLASTIC POLYURETHANES MIXED WITH ETHYLENE COPOLYMERS

Graham Jarrett, Hitchin, England, assignor to Imperial Chemical Industries Limited, London, England

Filed June 21, 1974, Ser. No. 482,028

Claims priority, application United Kingdom, July 30, 1973, 36137/73

Int. Cl.² C08L *75/04*

U.S. Cl. 260—859 R **6 Claims**

1. A process for the manufacture of a thermoplastic polyurethane elastomer composition having a reduced tendency to blocking compared with the thermoplastic polyurethane elastomer itself, which comprises forming a thermoplastic polyurethane elastomer of high tensile strength by reacting an organic diisocyanate with an aliphatic polymeric diol of molecular weight greater than 800 and a chain-extending agent which consists of a diol of molecular weight less than 250, the reactants being free from ethylenic unsaturation, and thereafter blending the thermoplastic polyurethane elastomer with from 1 to 5% by weight, based on the polyurethane, of an ethylene copolymer consisting of 98.3 to 79 molar % of ethylene copolymerized with from 1.7 to 21 mole % of an unsaturated ester of a fatty acid, said ester containing from 3 to 8 carbon atoms.

3,970,716

FLAME RESISTANT THERMOPLASTIC BLEND

Carl A. Evers, Naugatuck; Harold G. Wolf, Jr., Waterbury, and Howard S. Kravitz, Naugatuck, all of Conn., assignors to Uniroyal, Inc., New York, N.Y.

Filed June 5, 1974, Ser. No. 476,344

Int. Cl.² C08L *75/00*

U.S. Cl. 260—859 R **15 Claims**

1. A flame resistant thermoplastic composition comprising a blend of

a. a thermoplastic polyurethane elastomer essentially devoid of ethylene unsaturation and free —NCO groups,

b. a chlorinated polyethylene having a chlorine content of 25 to 50 percent by weight,

c. a flame retardant selected from the group consisting of 1,2,3,4,7,8,9,10,13,13,14,14-dodecaachloro-1,4,4a,-6a,7,10,10a12a-octahydro-1,4:7,10-dimethano-dibenzocyclooctane, 1,2,3,4,5,6,7,8,10,10,11,11-dodecachloro-1,4,4a,4b,5,8,8a,9a-octahydro-1,4:5,8-dimethano-dibenzofuran, 6-(1′,4′,5′,6′,7′,7′-hexachloronorborn-5′-en-2′-yl)-1,2,3,4,10,10-hexachloro-1,4,4a,5,6,7,8,8a-octahydro-1,4:5,8-dimethanonaphthalene, and 6-(1′,4′,5′,6′,7′,7′-hexachloronorborn-5′-en-

2'-yl)-1,2,3,4,10,10,-hexachloro-1,4,4a,5,6,7,8,8a-octahydro-1,4-methano-naphthalene, wherein
the weight ratio of (a) to (b) in said blend is within the range from 90:10 to 60:40 and the mount of (c) is from 15 to 25 parts per 100 parts by weight of (a) plus (b).

3,970,717
SATURATED HYDROXY POLYESTER URETHANES AND STYRENE COPOLYMERS

Horst Müller-Albrecht, Cologne; Bernd Quiring, Leverkusen; Manfred Dollhausen, Hitdorf, and Jochen Wulff, Benrath, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Nov. 11, 1974, Ser. No. 522,399
Claims priority, application Germany, Nov. 9, 1973, 2355942
Int. Cl.² C08L *75/00*
U.S. Cl. 260—859 R **5 Claims**

1. A composition of matter comprising:
A. an hydroxy polyester urethane having a molecular weight above about 30,000, said urethane derived from
1. a saturated polyester with a molecular weight above about 600,
2. from 0 to 400 mol percent based on polyester (1) of a diol chain-lengthening agent having a molecular weight of between about 62 and about 300, and
3. an organic polyisocyanate, and
B. a polymer selected from the group consisting of
i. copolymers of styrene and/or α-methyl styrene with at least one other olefinically unsaturated monomer, and
ii. mixtures of (i) with a rubbery elastic polymer,
wherein the weight ratio of component (A) to component (B) is between 1:0.5 and 1:3.

3,970,718
METHOD OF PRODUCING POLYMER COMPOSITIONS BASED ON CHLORINATED POLYETHYLENE

Akira Takahashi, Megurizawa; Hiroo Kojima, Seki; Masao Ogawa, Minami-Karasuyama; Hiroshi Osuka, Yokohama, and Shoichi Kobayashi, Tokyo, all of Japan, assignors to Showa Denko Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 134,826, April 16, 1971, Pat. No. 3,887,648, which is a continuation-in-part of Ser. No. 784,517, Nov. 22, 1968, Pat. No. 3,673,279, which is a continuation-in-part of Ser. No. 339,899, Jan. 24, 1964, Pat. No. 3,406,251. This application Jan. 28, 1975, Ser. No. 544,706
Int. Cl.² C08L *51/00, 53/00*
U.S. Cl. 260—876 R **15 Claims**

1. A method for producing a blended polymer composition comprising blending
I. an interpolymer prepared by contacting
A. a polymer component selected from the group consisting of chlorinated polyethylene of a degree of chlorination of 10–50 percent and a mixture consisting of 50–90 percent by weight of said chlorinated polyethylene and 10–50% by weight of a copolymer selected from an ethylene-propylene copolymer rubber, an ethylene-propylene-nonconjugated diene terpolymer rubber and an ethylene-vinyl acetate copolymer rubber, with
B. a monomer mixture comprising
b_1. at least one monomer selected from styrene, alpha-methyl styrene, t-butyl styrene and chloro-styrene and
b_2. at least one monomer selected from acrylonitrile and methacrylonitrile
under polymerization conditions in the presence of a polymerization initiator to form an interpolymer of components (A) and (B) wherein the polymer component (A) and monomer component (B) are suspended in the form of fine particles in a state of separation from each other in an aqueous medium, said component (A) having a particle size of 5–150 Tyler mesh, the weight ratio of said component (A) to component (B) ranging from about 10:90 to about 90:10 with
II. a polymer separately prepared from said component (B), the overall weight ratio of component (A) to component (B) in said blended copolymer being from 5:95 to 50:50.

3,970,719
PREPARATION OF BLOCK COPOLYMERS

James T. Edmonds, Jr., Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

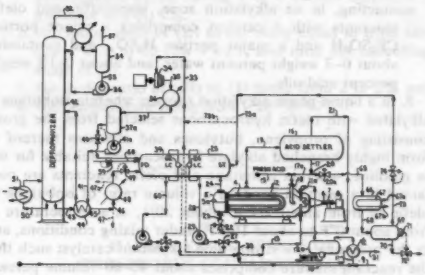
Filed Jan. 16, 1958, Ser. No. 709,194
Int. Cl.² C08L *23/00;* **C08F** *297/08*
U.S. Cl. 260—878 B **8 Claims**

1. A block copolymer comprising a first polymer block of a homopolymer of propylene and ajacent thereto a second polymer block of a copolymer of ethylene and propylene.

3,970,720
RECOVERY OF HYDROCARBONS FROM ACID SETTLER BOTTOMS

Charles L. West, Shawnee Mission, Kans., assignor to Stratford Engineering Corporation, Kansas City, Mo.

Filed May 30, 1974, Ser. No. 474,814
Int. Cl.² C07C *3/54*
U.S. Cl. 260—683.62 **6 Claims**



1. A process of alkylation of paraffinic hydrocarbons by olefinic hydrocarbons in the presence of sulfuric acid catalyst in a reaction step wherein:
a. a reaction mixture of hydrocarbons and sulfuric acid catalyst is withdrawn from said reaction step,
b. the sulfuric acid catalyst phase is separated from the hydrocarbon phase in a settling step,
c. a major portion of said catalyst phase from said settling step is returned to said reaction step and a minor portion of said catalyst phase is treated to separate absorbed hydrocarbons prior to withdrawing said phase from the alkylation process as a spent acid stream,
d. said reaction step and settling step being maintained under sufficient pressure that said reaction mixture, said hydrocarbon phase and said catalyst phase are held in liquid state,
e. the pressure is reduced on the hydrocarbon phase from said settling step to vaporize volatile hydrocarbons and thus refrigerate said hydrocarbon phase and
f. said refrigerated hydrocarbon phase is passed in indirected heat exchanging relationship with said reaction step to lower the temperature thereof and vaporize further volatile hydrocarbons,
g. said hydrocarbon phase from said indirect heat exchanging relationship with said reaction step being passed to a first vapor-liquid separating step wherein a vapor portion of said hydrocarbon phase is separated from a liquid portion thereof and said liquid and said vapor portions being separately removed from said first separating step, the improvement which comprises:

h. heating said spent acid stream prior to withdrawing the same from said process and passing said heated stream to a second vapor-liquid separating step to separate said absorbed hydrocarbons from said spent acid,

i. returning separated hydrocarbons from said second separating step to said first separating step,

j. and withdrawing spent liquid acid from said second separating step.

3,970,721

ALKYLATION PROCESS FOR PRODUCTION OF MOTOR FUELS UTILIZING SULFURIC ACID CATALYST WITH TRIFLUOROMETHANE SULFONIC ACID

James W. Brockington, and Richard H. Bennett, both of Richmond, Va., assignors to Texaco Inc., New York, N.Y.

Filed Mar. 24, 1975, Ser. No. 561,401
Int. Cl.² C07C 3/54
U.S. Cl. 260—683.63 7 Claims

1. In a liquid phase alkylation process for alkylating C_4-C_6 isoparaffins with C_3-C_5 mono-olefins to form alkylate hydrocarbon products; the improvement which comprises:

contacting, in an alkylation zone, isoparaffin and olefin reactants with a catalyst comprising a minor portion CF_3SO_3H and a major portion H_2SO_4, and containing about 0–3 weight percent water, and about 0–10 weight percent acid oils.

5. In a liquid phase alkylation process wherein isobutane is alkylated with olefin hydrocarbons selected from the group consisting of propylene, butylenes and mixtures thereof to form highly branched alkylate hydrocarbons suitable for use in gasoline, wherein isobutane and olefin reactants are contacted in a reaction zone, in a volume ratio of isobutane to olefin of from about 2/1 to about 20/1, at a temperature of from about 0°F to about 100°F, under mixing conditions, and in the presence of a strong acid alkylation catalyst such that the reaction mixture comprises about 40–60 volume percent hydrocarbon phase and 60–40 volume percent acid phase; the improvement which comprises:

contacting isobutane and said olefin reactants in the reaction zone at an olefin space velocity of from about 0.1 to about 1.0 volumes olefin per hour per volume catalyst with an acid catalyst comprising trifluoromethane sulfonic acid and sulfuric acid in a weight ratio of 0.166/1.

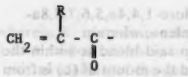
3,970,722

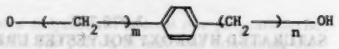
METHOD FOR PREPARING A MODIFIED CRYSTALLINE PROPYLENE POLYMER

Sadahide Ogihara, Fujisawa; Yoichi Nakamura, Yono, and Osamu Fukui, Toyonaka, all of Japan, assignors to UBE Industries, Ltd., Tokyo, Japan

Filed Feb. 14, 1975, Ser. No. 549,863
Claims priority, application Japan, Mar. 5, 1974, 49-24811
Int. Cl.² C08F 255/02
U.S. Cl. 260—878 R 12 Claims

1. A method for preparing a modified crystalline propylene polymer usable as a bonding agent, comprising heating a crystalline propylene polymer uniformly mixed with a modifying composition, said modifying composition consisting of an organic peroxide and at least one modifying agent selected from the group consisting of the ethylenically unsaturated organic compounds of the formula





wherein R represents a hydrogen atom or methyl radical, and *m* and *n* represent 0 or 1 respectively, wherein said modifying agent is used in an amount of 0.1 to 7.0% based on the weight of said crystalline propylene polymer, wherein said organic peroxide is used in an amount of 0.1 to 5% based on the weight of said crystalline propylene polymer, and wherein said organic peroxide is used in an amount of 5 to 80% based on the weight of said modifying agent, said heating being conducted at a temperature lower than the thermal decomposing point but not lower than the melting point of said crystalline propylene polymer.

3,970,723

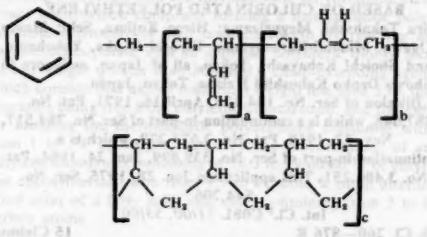
IMPREGNATING AND ENCAPSULATING COMPOSITION FOR USE WITH TYPE TRANSFORMERS AND TRANSFORMERS CONTAINING SUCH COMPOSITION

Robert D. Mees, and Gordon M. Bell, both of Fort Wayne, Ind., assignors to General Electric Company, Carmel, Ind.

Filed July 31, 1974, Ser. No. 493,342
Int. Cl.² C08L 9/00
U.S. Cl. 260—880 R 14 Claims

1. A resin system for use in the insulation of electrical equipment comprising the reaction product of:

a. 100 parts of a butadiene polymer having the formula:



where *a* is from 0.40 to 0.80, *b* is from 0.10 to 0.20, and *c* is from 0.15 to 0.35, the sum of *a*, *b*, and *c* being sufficient for the polymer to have a molecular weight of from 1700 to 2100;

b. from 10 to 34 parts, by weight, of a vinyl monomer selected from the class consisting of t-butyl styrene and vinyl toluene; and

c. from 5 to 11 parts, by weight, trimethylol propane trimethacrylate.

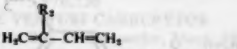
3,970,724

PROCESSING METHOD FOR SYNTHETIC RUBBERS

Emanuel Schoenberg, Brimfield, and Thomas L. Hanlon, Akron, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Sept. 27, 1973, Ser. No. 401,317
Int. Cl.² C08L 9/00
U.S. Cl. 260—894 2 Claims

1. A process for preparing a mixture of high cis-1,4 configuration polymer and high trans-1,4 configuration polymer comprising the steps of contacting monomers conforming to the structural formula



wherein R_1 may be an alkyl group containing from 1 to 2 carbon atoms, with a catalyst based on an organoaluminum compound with titanium tetrachloride to produce a desired amount of high cis-1,4 configuration polymer and subsequently adding, in the presence of the cis producing catalyst, a catalyst based on organoaluminum compounds with compounds selected from the group consisting of vanadium trichloride, vanadium tetrachloride and vanadium oxychloride to form a high trans-1,4 configuration polymer wherein the mole ratio of the aluminum/titanium in the cis producing catalyst is from about 0.6 to about 1.2 and the mole ratio of the aluminum/vanadium in the trans producing catalyst is from about 3.0 to about 10.0.

3,970,725

POWDERY COATING COMPOSITION AND PROCESS FOR PREPARING THE SAME

Hideyoshi Tugukuni, Sakai, and Masafumi Kano, Nagaokakyo, both of Japan, assignors to Dai Nippon Toryo Co., Ltd., Osaka, Japan

Filed Sept. 25, 1973, Ser. No. 400,621

Claims priority, application Japan, Sept. 26, 1972, 47-96541; Oct. 28, 1972, 47-108306

Int. Cl.² C08L *33/08*

U.S. Cl. 260—901 **7 Claims**

1. A powdery coating composition comprising polymer particles having an average particle size within the range of 0.5 to 200μ and composed of, as a core component, an acrylic copolymer having a softening point not exceeding 90°C. and containing 5 to 60% by weight of units of a monomer whose homopolymer has a Tg lower than 0°C. and, as an outer component, an acrylic polymer having a softening point of at least 100°C. and containing at least 60% by weight of units of a monomer whose homopolymer has a Tg higher than 50°C., wherein the weight ratio of the core component to the outer component is within a range from 50/50 to 100/1, and said outer component covers said core component.

3,970,726

POLYCYCLIC PHOSPHATE ESTERS AND PROCESS FOR PREPARING SAME

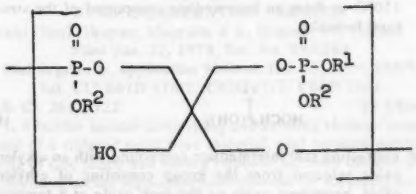
Wadim Batorewicz, New Haven, Conn., assignor to Uniroyal, Inc., New York, N.Y.

Filed Jan. 23, 1975, Ser. No. 543,289

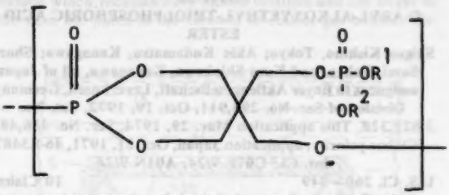
Int. Cl.² C07F *9/15;* **C08J** *9/00*

U.S. Cl. 260—927 R **13 Claims**

1. A phosphate ester having the formula $RO-(A)_m(B)_n]H$ wherein A has the structural formula



and B has the structural formula



wherein R,R^1 and R^2 are the same or different and are linear or branched primary radicals selected from alkyl having 1 to 6 carbon atoms, and haloalkyl and hydroxyalkyl having 2 to 6 carbon atoms; m and n are integers from 0 to about 4 and the sum of m plus n is from 1 to about 4.

6. A method for preparing the phosphate ester of claim 1 comprising:

a. reacting a polycyclic compound (I) having the formula $(C_5H_8O_4P_2)X_uY_v$, wherein X is bromine or chlorine, Y is OR^3, wherein R^3 is an alkyl group having 1 to 6 carbon atoms or an haloalkyl group having 2 to 6 carbon atoms, u and v are integers with values of 0, 1 or 2, and the sum of u plus v is 2; with (II) a primary alcohol of the formula HOQ, wherein Q has the meanings of R^3 or is a primary hydroxyalkyl group having 2 to 6 carbon atoms, in the presence of (III) Cl_2;

b. the molar ratio of (II) to (I) being equal to from about $(2u + v)$:1 to 10 $(2w + v)$:1, said ratio not exceeding a value of 20;

c. the molar ratio of (III) to (I) being from 2 to 2.2, and

d. the temperature being from −20° to 80°C.

3,970,727

HALOGENATED ESTERS OF PHOSPHORUS-CONTAINING ACIDS

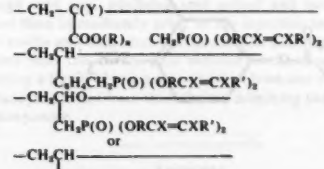
Gaetano F. D'Alelio, 2011 E. Cedar St., South Bend, Ind. 46617

Division of Ser. No. 383,599, July 30, 1973, Pat. No. 3,900,536, which is a continuation-in-part of Ser. No. 179,543, Sept. 10, 1971, Pat. No. 3,780,144, which is a continuation of Ser. No. 785,335, Dec. 19, 1968, abandoned. This application Jan. 9, 1975, Ser. No. 539,812

Int. Cl.² C07F *9/40*

U.S. Cl. 260—932 **9 Claims**

1. A phosphorus-halogen-containing polymer having at least five repeating units of the formula



wherein Y represents H, CH_3 or Cl;

X represents Cl or Br;

R represents a divalent hydrocarbon radical of 2–20 carbon atoms;

R′ represents H, X or R″;

R″ represents a monovalent hydrocarbon radical of 1–20 carbon atoms and

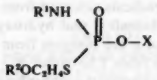
n″ represents an intager having a value of D or I.

3,970,728
O-ARYL-ALKOXYETHYL-THIOLPHOSPHORIC ACID ESTER

Shigeo Kishino, Tokyo; Akio Kudamatsu, Kanagawa; Shozo Sumi, Tokyo, and Kozo Shiokawa, Kanagawa, all of Japan, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Division of Ser. No. 298,911, Oct. 19, 1972, Pat. No. 3,822,328. This application Mar. 29, 1974, Ser. No. 456,481
Claims priority, application Japan, Oct. 21, 1971, 46-83487
Int. Cl.² C07F 9/24; A01N 9/36
U.S. Cl. 260—949 **10 Claims**

1. An O-aryl-S-alkoxy-ethyl-thiolphosphoric acid ester amide of the formula

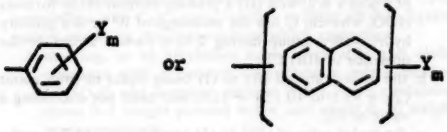


in which

R^1 is hydrogen or lower alkyl,

R^2 is lower alkyl, and

X is a group of the formula

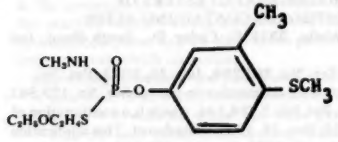


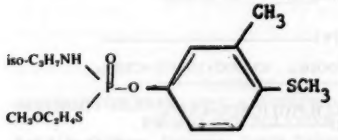
in which

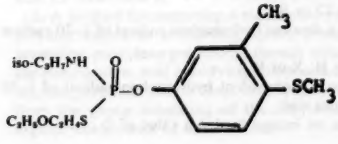
m is 1, 2 or 3, and

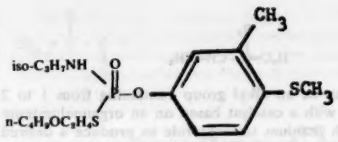
each Y independently is lower alkoxy, lower alkylmercapto or lower alkoxycarbonyl.

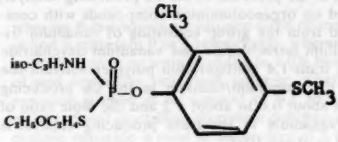
4. An O-aryl-S-alkoxy-ethyl-thiolphosphoric acid ester amide selected from the group consisting of

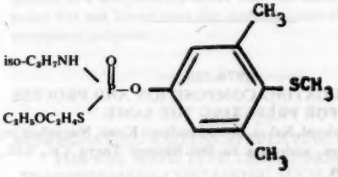










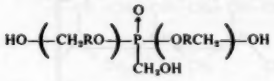


3,970,729
PROCESS OF SYNTHESIZING DI-POLYOXYLALKYLENE HYDROXYMETHYLPHOSPHONATE

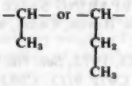
Edward N. Walsh, New City, and Kyung Sup Shim, Irvington, both of N.Y., assignors to Stauffer Chemical Company, Westport, Conn.

Filed Aug. 5, 1974, Ser. No. 494,685
Int. Cl.² C07F 9/40; C08F 2/44
U.S. Cl. 260—978 **7 Claims**

1. A method of preparing compounds of the structural formula:

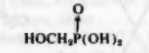


wherein R is CH_2,



and $n+m = 2-10$; comprising the steps of:

a. contacting phosphorous acid with a reactant selected from the group consisting of formaldehyde and formaldehyde polymers at a temperature between about 90°C. and 150°C. to form an intermediate compound of the structural formula:



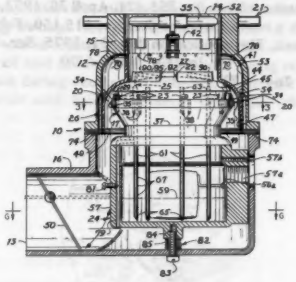
(II)

b. contacting said intermediate compound with an alkylene oxide selected from the group consisting of ethylene oxide, propylene oxide or butylene oxide at a temperature between about 30°C. and 100°C. to form a compound of structural formula (I).

3,970,730
VARIABLE VENTURI CARBURETOR

Clinton L. Graybill, P.O. Box 396, Superior, Mont. 59872

Filed Feb. 7, 1975, Ser. No. 548,166
Int. Cl.² F02M 7/24
U.S. Cl. 261—41 D 17 Claims



1. A carburetor for an internal combustion engine, comprising:

an induction duct having an open air intake end, an intermediate mixing chamber and a remaining end adapted to be mounted to an intake manifold for receiving and guiding air downstream from the intake end through the mixing chamber to the remaining end and into the intake manifold in response to operation of the engine;

a fuel dispensing orifice located within the induction duct;

means for supplying fuel to the fuel dispensing orifice in response to movement of air through the induction tube;

a first venturi member located within the induction duct along a central axis and adjacent the fuel dispensing orifice immediately upstream of the mixing chamber;

a second venturi member located within the induction duct operatively associated and coaxial with the first venturi member to create a restricted cross section across the induction duct;

said second venturi member having a tubular downstream portion with an upstream edge and a downstream edge; an outwardly flared portion extending arcuately outward and upstream from the upstream edge of the tubular downstream portion; a conical upstream portion extending upstream from the outwardly flared portion and having an upstream diameter increasing to an upstream edge; and

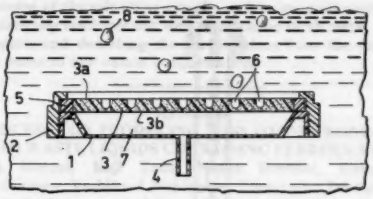
throttle means enabling relative selective axial movement of the venturi members to selectively change the area of the restricted cross section and control the flow of air into the intake manifold.

3,970,731
BUBBLE-GENERATING AERATOR

Erkki Olavi Oksman, Mayratie 6 A, Helsinki 80, Finland

Filed Jan. 22, 1975, Ser. No. 543,053
Claims priority, application Finland, Jan. 23, 1974, 185/74
Int. Cl.² B01D 47/02; C02C 1/12; C02D 1/00
U.S. Cl. 261—122 11 Claims

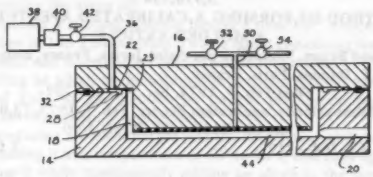
1. A bubble aerator comprising and aerating element constituted of a sintered open pore material, said aerating element being of disc shape and having opposite surfaces thereof, and a mounting means supporting said element for supplying air to a first surface thereof while said element is submerged in a liquid and the second surface thereof is exposed to said liquid, said element being provided with recesses in said second surface which recesses have closed bottoms and are larger in size than the pores in the element to collect gas bubbles discharged from the pores and discharge the gas in the form of larger bubbles from the element.



3,970,732
METHOD OF MOLDING RIGID FOAMED POLYURETHANE ARTICLES

Mathew A. Slaats, and David E. Overton, both of Jasper, Ind., assignors to Kimball International, Inc., Jasper, Ind.

Filed Sept. 26, 1973, Ser. No. 401,114
Int. Cl.² B29D 27/00
U.S. Cl. 264—40.5 6 Claims



1. The method of making rigid articles of polyurethane foam in which a mixture of a polyol and isocyanate and a blowing agent is supplied to and foamed within a mold which includes separable parts defining a mold cavity therebetween when closed which comprises: injecting the polyol and isocyanate and blowing agent in admixed form to the mold cavity, and applying suction to the cavity via a restricted slit-like gap extending about the periphery of the cavity at the juncture of the mold parts not later than immediately following the injection of the aforementioned mixture into the cavity to cause extremely rapid foaming of the said admixture with expansion and flow thereof to fill the cavity without significant flashing through said gap, admixing said polyol and isocyanate not sooner than immediately prior to the injection thereof to the mold cavity and immediately adjacent the point of entry of the mixture into the cavity, said method furthermore including admixing a liquid blowing agent with at least one of said polyol and isocyanate not later than time of admixing the polyol with the isocyanate.

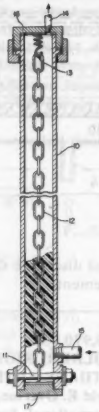
3,970,733
METHOD OF MAKING AN ENCAPSULATED CHAIN

Louis Seelbach Kraft, Stow, and Thomas E. Burkley, Akron, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Apr. 16, 1971, Ser. No. 134,595
Int. Cl.² B29D 3/00
U.S. Cl. 264—135 2 Claims

1. A method of encapsulating a metal chain consisting suspending the chain in an elongated chamber, said chain having spacers positioned between each link thereof, coating

the surface of the chamber with a release agent, and then filling the chamber under reduced pressure with an encapsulating agent to cover the links and spacers, reacting the encapsulating agent to give the chain an elastomeric coating.

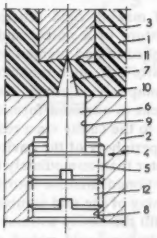


3,970,734

METHOD OF FORMING A CALIBRATED APERTURE IN A MOLDED ARTICLE

Roland Broux, Monnetier-par-Saint-Jorioz, France, assignor to S.T. Dupont, Paris, France

Filed Feb. 5, 1974, Ser. No. 439,757
Claims priority, application France, Feb. 7, 1973, 73.04230
Int. Cl.² B29F *1/00*; B29C *5/00*
U.S. Cl. 264—219 **7 Claims**



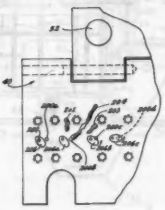
1. A method of molding a part with a tapered passage therein and a calibrated aperture at the end of said passage, said method comprising providing a mold core and a mold wall in spaced relation, mounting a tapered pin in the mold wall for displacement towards the mold core, said pin being formed with an end facing the mold core which is of pointed shape, said pin being formed of a material harder than that of the facing portion of the mold core, moving said pin towards the core to cause said pointed end to penetrate into a face of said core and form its own housing therein so that the pin is supported at both ends thereof, permitting penetration of said tapered pin into said core to a pre-determined depth to obtain a particular cross-sectional area of the tapered pin at the face of the core, injection moulding a material between said mold core and mold wall to form a part having a tapered passage therein defined by said tapered pin with a calibrated aperture at the end of said passage whose size corresponds to that of said particular cross-sectional area of the tapered pin at said face, and removing said pin from said passage and separating said molded part from the molding wall and molding core.

3,970,735

MOLDING METHOD FOR SPLICING ELECTRICAL CABLE

Arthur L. Nelson, La Jolla, Calif., assignor to Townsend and Townsend, San Francisco, Calif.

Continuation of Ser. No. 355,421, April 30, 1973, abandoned, which is a continuation of Ser. No. 115,150, Feb. 26, 1971, abandoned. This application Jan. 31, 1975, Ser. No. 545,948
Int. Cl.² B29C *6/00*
U.S. Cl. 264—272 **2 Claims**



1. A method for insulating high voltage electrical cable comprising the steps of:

providing an elongate mold for placement over a portion of the cable, the mold defining an elongate cavity and including a plurality of relatively small apertures communicating the cavity with the exterior, the apertures being spaced over at least a portion of the length of the cavity;

placing said cable within the mold cavity;

forcing a moldable, electrically insulating vulcanizable material into said mold cavity by applying pressure to the material to thereby flow it into the cavity;

maintaining the apertures in their open position during the forcing step to thereby vent insulating material and entrapped gas from the mold cavity;

closing at least some of the apertures to facilitate the propagation of the material and of the pressure throughout the cavity;

heating the material sufficiently to vulcanize it at an elevated temperature; and

maintaining the elevated temperature and the elevated pressure for a sufficient time to establish a bond between the material and the existing insulation on the cable along their interface.

3,970,736

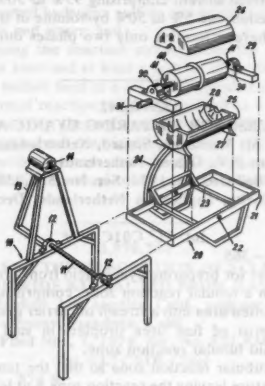
METHOD OF MANUFACTURING HOLLOW ELEMENTS FROM THERMOPLASTIC MATERIALS

Pierre Louis Gimaret, Cailloux-sur-Fontaine, France, assignor to Etablissements Metallurgiques du Val d'Ambv, Lyon, France

Continuation of Ser. No. 123,237, March 11, 1971, abandoned. This application Jan. 29, 1975, Ser. No. 545,090
Int. Cl.² B29C *5/04*; B29F *5/00*
U.S. Cl. 264—310 **5 Claims**

1. A method for the manufacture by moulding with thermoplastic resins in powdered form of hollow elements of substantially cylindrical shape comprising a cylindrical body and two ends and having an internal volume of at least one thousand liters, and the method comprising the steps of introducing a particulate thermoplastic resin material into a cylindrical mould, said thermoplastic resin being selected from the group consisting of polyethylene, polypropylene, thermoplastic polyolefin copolymers and a self-condensate of 11-aminoundecanoic acid, a first stage of heating during which a rotational movement about a central longitudinal axis of said

cylindrical mould is imparted to the mould while at the same time heating both the body and the ends of the mould, said longitudinal axis being maintained horizontal; a second stage of moulding the ends during which rotational movement in alternate directions in sequence is imparted to the mould about said axis of rotation while simultaneously heating said body and ends of said mould, said second stage further including the step of alternately tilting said mould in opposite directions about a central axis transverse to said axis of rotation at predetermined intervals, said longitudinal and transverse axis both passing through the gravity center point of the mold; which intervals at least exceed the time required for several revolutions of said mould, with said mould being retained in tilted position during each entire interval, while said alternate rotation about said axis of rotation continues, the mould



thereby being tilted and thus inclined first to one side, then to the other, while heating both said body and ends of the mould; a third stage of progressively cooling the ends of the mould by first reducing and then completely terminating the heating of the ends of the mould, with the alternating tilting and rotation of the mould continuing as in said second stage; a fourth stage of moulding the body in which the same alternating rotational movement as in the second stage is imparted to the mould, but where the axis of rotation remains substantially horizontal and heat is applied only to said body of the mould; a fifth stage of cooling the body in which the method of the fourth stage is continued and the heating of the body is terminated, and a sixth stage of removing the mould, said heating being sufficient to melt said powder at least partially and to cause said powder to agglomerate.

3,970,737

METAL, PARTICULARLY GOLD, RECOVERY FROM ADSORBED CYANIDE COMPLEXES

Raymond John Davidson, 5 Max Michaelis St., Montgomery Park, Johannesburg Transvaal, South Africa

Filed Oct. 29, 1974, Ser. No. 518,833

Claims priority, application South Africa, Nov. 23, 1973, 73/8939; Feb. 22, 1974, 74/1182; Apr. 18, 1974, 74/2482

Int. Cl.² C01G *3/00, 5/00, 7/00, 53/00*

U.S. Cl. 423—27 **11 Claims**

1. A method of recovering metal values selected from gold, silver, copper and nickel from a support having adsorbed thereon the metal values in the form of a cyanide ionic complex, the metal values forming part of the anionic portion thereof, including the step of contacting the support with water of low metal cation concentration to desorb the metal values, the cation of the complex being an alkaline earth metal cation and the support being contacted with an alkali metal salt solution prior to the desorption step.

8. A method of recovering gold or silver values from a support having adsorbed thereon the metal values in the form of an alkaline earth metal cyanide ionic complex including the steps of contacting the support with alkali metal salt solution, the anion of the salt being capable of forming an insoluble or substantially insoluble salt with the alkaline earth metal of the complex, and desorbing the metal values from the support with water of low cation concentration.

3,970,738

PROCESS FOR PRODUCING IRON OXIDE PRODUCTS FROM WASTE LIQUIDS CONTAINING FERROUS SALTS

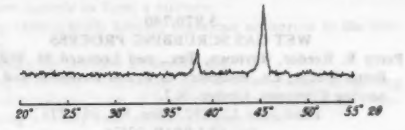
Goro Matsui; Koji Toda; Nanao Horiishi; Kazuyoshi Wakimoto; Yoshifumi Nishiyama; Tsuneyoshi Taketa, and Kazushi Takama, all of Hiroshima, Japan, assignors to Toda Kogyo Corporation, Hiroshima, Japan

Filed Dec. 23, 1974, Ser. No. 535,194

Claims priority, application Japan, July 15, 1974, 49-81496

Int. Cl.² C01G *49/02*

U.S. Cl. 423—140 **12 Claims**



1. A process for producing a spinel-type iron oxide powder comprising the steps of:

preparing a starting solution having a total Fe^{2+} concentration of 1 to 2 mols/l from a waste liquid containing ferrous salts and manganese compounds as impurities;

adding an alkali to the solution to suspend 5 to 30 mole % of Fe^{2+} in the solution as ferrous precipitate and to thereby obtain a suspension;

introducing an oxidative gas into the suspension while maintaining it at a temperature of 60° to 90°C and fully agitating it while continuously adding an alkali to the suspension so as to always maintain the pH of the suspension at a value in the range of 5 to 6 with a tolerance of ± 0.05, to thereby form particles of spinel-type iron oxide ($FeOx \cdot Fe_2O_3$ wherein $0 < x \leqq 1$) having a uniform quality; and

suspending the particles of spinel-type iron oxide in an aqueous solution having a pH of 3.5 to 5.0 as adjusted with sulfuric acid or nonoxidative inorganic acid to solubilize polyvalent manganese contained in the particles of spinel-type iron oxide, subsequently separating the particles of spinel-type iron oxide from the suspension by filtration, washing the particles with water, and drying the same to obtain particles of spinel-type iron oxide having a manganese content of less than 0.2% by weight calculated as MnO.

3,970,739

PROCESS FOR CONCURRENTLY TREATING PROCESS WASTE WATERS AND FLUE GASES FROM AMMONIA SYNTHESIS PROCESS PLANTS

Tatsuo Shiraishi; Hiroshi Fukusen; Sachio Oishi; Shinkichi Shimizu; Hiroyuki Nishikawa, and Tetsu Wakabayashi, all of Niihama, Japan, assignors to Sumitomo Chemical Company, Limited, Japan

Filed Dec. 6, 1974, Ser. No. 530,302

Claims priority, application Japan, Apr. 11, 1974, 49-41219

Int. Cl.² C01B *21/00*

U.S. Cl. 423—23 S **19 Claims**

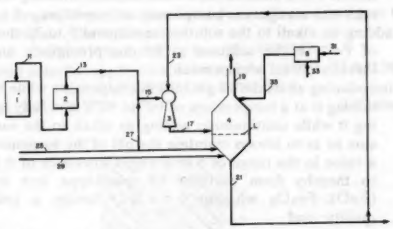
1. In a process for concurrently treating process waste waters and flue gases discharged from an ammonia-synthesis gas manufacturing plant obtained by reforming hydrocarbons with steam, said process waste waters containing ammoniacal

nitrogens and organic materials consisting essentially of methanol and a small amount of organic amines, which are derived from the condensation of the steam, and said flue gases containing nitrogen oxides, which are derived from the combustion of hydrocarbon fuels for generating heat and power required for reforming the hydrocarbons, the improvement which comprises stripping the ammoniacal nitrogens and the organic materials present in the waste waters in gaseous form, decomposing methanol in the resulting stripped gas with a first catalyst for selectively decomposing methanol to carbon dioxide and water or to carbon dioxide, water and hydrogen, at a temperature of from 120° to 400°C. while the ammonia is left undecomposed, mixing the resulting gases with the flue gases so as to provide a gaseous mixture containing ammonia therein in an amount of 0.3 to 10 moles per mole of nitrogen oxides, and reducing the nitrogen oxides with the ammonia by bringing the resulting gaseous mixture into contact with a second catalyst for reducing the nitrogen oxides to nitrogen gas and water at a temperature of from 150° to 700°C.

3,970,740
WET GAS SCRUBBING PROCESS

Perry E. Reeder, Baytown, Tex., and Leonard M. Williams, Baton Rouge, La., assignors to Exxon Research and Engineering Company, Linden, N.J.

Filed June 13, 1973, Ser. No. 369,771
Int. Cl.² B01D *53/34*
U.S. Cl. 423—242 **24 Claims**



1. A process for removing at least a portion of the sulfur dioxide and cracking catalyst fines, including from about 1 to 40 weight percent particles under one micron in size, from a gaseous effluent containing the same, which comprises:

a. contacting said gaseous effluent with water to produce a water-saturated gas;

b. introducing the water-saturated gas containing said particles under one micron in size into a venturi structure and contacting the same with a relatively colder, high velocity stream of an aqueous scrubbing mixture containing a basic material selected from the group consisting of alkali metal hydroxides, ammonium hydroxide, and ammonia, said scrubbing mixture being maintained at a pH in the range varying from about 6 to about 7;

c. passing the admixture of said gas and scrubbing mixture through a constricted passage of said venturi structure to increase the velocity thereof;

d. recovering the admixture resulting from step (c) from the venturi structure, and

e. separating said recovered admixture into a liquid portion and a gaseous portion having a reduced content of cracking catalyst fines and sulfur dioxide.

3,970,741
METHOD FOR PURIFYING PHOSPHORIC ACID

Engelhard Wilhelm Pavonet, Flemalle-Haute, Belgium, assignor to "Societe de Prayon", Belgium

Filed Jan. 31, 1974, Ser. No. 438,220
Claims priority, application Luxemburg, Feb. 2, 1973, 66958
Int. Cl.² C01B *25/16*
U.S. Cl. 423—321 S **9 Claims**

1. In the method for purifying phosphoric acid obtained by the reaction of sulfuric acid with natural phosphates, said method comprising extracting said phosphoric acid with an ether containing solvent forming an aqueous phase containing the major part of the impurities and an organic phase containing purified phosphoric acid and separating both said phases, the improvement which comprises extracting the phosphoric acid with a mixed solvent comprising 95% to 50% by volume of isopropyl ether and 5% to 50% by volume of tributyl phosphates and thereby forming only two phases during said extracting.

3,970,742
PROCESS FOR PREPARING CYANIC ACID

Johannes D. M. Verstegen, Sittard, Netherlands, assignor to Stamicarbon B.V., Geleen, Netherlands

Filed Dec. 23, 1974, Ser. No. 535,838
Claims priority, application Netherlands, Dec. 27, 1973, 7317668
Int. Cl.² C01C *3/14*
U.S. Cl. 423—365 **8 Claims**

1. A process for preparing cyanic acid from urea by evaporating urea in a tubular reaction zone, comprising

atomizing molten urea into a stream of carrier gas, passing the resulting mist of fine urea droplets in said carrier gas through said tubular reaction zone,

heating the tubular reaction zone so that the temperature of the gas mixture leaving the reaction zone is at least 250°C,

wherein said carrier gas is introduced into the reaction zone at a rate at least equal to V, wherein

$$V \geq 2.8\, a^{0.1}\, \rho_o^{-0.4} \left(\frac{T}{p}\right) 0.5\, \frac{2.5}{n_\theta^{0.1}} (1 + a\,\rho_o)^{-1}$$

where

V = superficial gas velocity at the entrance of the tubular reactor, in m/sec.

a = amount of carrier gas/amount of urea in m^3 (N.T.P.)/kg

ρ_o 32 density of carrier gas at 0°C and 1 atm. abs., in kg/m^3

T = temperature of carrier gas, in °K

p = feed pressure of carrier gas, in kg/cm^2 abs.

n_θ = viscosity of carrier gas, in centipoises

3,970,743
PROCESS FOR THE PRODUCTION OF SULFUR FROM MIXTURES OF HYDROGEN SULFIDE AND FIXED NITROGEN COMPOUNDS

David K. Beavon, Pasadena, Calif., assignor to Ralph M. Parsons Company, Pasadena, Calif.

Filed Sept. 16, 1974, Ser. No. 506,305
Int. Cl.² C01B *17/04*
U.S. Cl. 423—574 R **5 Claims**

1. In a Claus process for sulfur production consisting of a thermal reaction stage and a catalytic Claus conversion stage wherein a portion of a total hydrogen sulfide feed is oxidized in the presence of oxygen in the thermal reaction stage to form sulfur dioxide in an amount sufficient to react with the balance of the hydrogen sulfide feed to form sulfur, a portion of the sulfur being formed in the thermal reaction stage and the balance in the catalytic Claus conversion stage, the improvement which enables continuous operation without the formation of solid nitrogen-sulfur salts with a feed gas stream containing substantial quantities of fixed nitrogen compounds

selected from the group consisting of ammonia, hydrogen cyanide and mixtures thereof which coprises:

a. combining in a first thermal reacton zone of the thermal reaction stage containing at least two separate thermal reaction zones in series, essentially all of a first hydrogen sulfide feed containing substantial quantities of fixed nitrogen compounds, a source of oxygen and a portion of a second hydrogen sulfide feed essentially free of fixed nitrogen compounds, the amount of oxygen fed to the first thermal reaction zone being insufficient to convert all of the hydrogen sulfide fed to said first thermal reaction zone to sulfur dioxide, the amount of said second hydrogen sulfide feed being sufficient to maintain said first thermal reaction zone at a temperature of from about 2,500° to about 3,000°F to form a reaction stream essentially free of fixed nitrogen compounds and containing unconverted hydrogen sulfide and formed sulfur dioxide, nitrogen and water; and

b. combining the reaction stream from the first thermal reaction zone and at least a portion of the balance of the second sulfide feed in a second thermal reaction zone of the thermal reaction stage maintained at a temperature below said first thermal reaction zone and separate from said first thermal reaction zone to form sulfur and a second reaction stream containing hydrogen sulfide and sulfur dioxide for feed to the catalytic Claus conversion stage.

3,970,744

PROCESS FOR THE PRODUCTION OF SULFUR FROM SULFUR DIOXIDE EXTRACTED FROM GAS STREAMS

Fred C. Riesenfeld, Los Angeles, Calif., assignor to Ralph M. Parsons Company, Pasadena, Calif.

Filed Nov. 7, 1974, Ser. No. 521,834

Int. Cl.² C01B *17/04*

U.S. Cl. 423—574 R **8 Claims**

1. A process for the production of sulfur from sulfur dioxide contained in gas streams which comprises:

a. passing a sulfur dioxide containing gas stream through a sulfur dioxide absorption zone containing an aqueous absorbent for sulfur dioxide to form a sulfur dioxide rich absorbent and a sulfur dioxide lean gaseous stream;

b. separating the sulfur dioxide rich absorbent from the absorption zone;

c. passing about one-third of the sulfur dioxide rich absorbent to a sulfur production zone;

d. passing the balance of the sulfur dioxide rich absorbent to a sulfur dioxide stripping zone to separate sulfur dioxide from the absorbent to form a sulfur dioxide lean absorbent for recycle to the absorption zone;

e. catalytically hydrogenating the sulfur dioxide separated from the sulfur dioxide rich absorbent in the stripping zone in the presence of a source of hydrogen to hydrogen sulfide at a temperature from about 300° to about 1000°F in the presence of a catalyst consisting of at least one supported metal selected from Group Va, VIa, VIII and the Rare Earth Series of the Periodic Table; and

f. passing the formed hydrogen sulfide to the sulfur production zone where sulfur is formed from the introduced hydrogen sulfide and sulfur dioxide.

3,970,745

METHOD FOR PRODUCING HYDROGEN FROM WATER

Norio Takeuchi, Isehara, Japan, assignor to Director-General of the Agency of Industrial Science and Technology, Tokyo, Japan

Filed Mar. 24, 1975, Ser. No. 561,161

Claims priority, application Japan, May 9, 1974, 49-51538; May 17, 1974, 49-54504

Int. Cl.² C01B *1/07, 1/02;* C01G *17/00*

U.S. Cl. 423—657 **5 Claims**

1. A method for producing hydrogen from water, characterized in that water is reduced to hydrogen in an autoclave at a temperature within the range of about 300°–900°C by using powdered metallic germanium in a molar ratio of at least 1:1, and thereafter the by-product germanium monoxide is reduced in the autoclave with sulfur dioxide at a temperature of about 400°–800°C to metallic germanium which is recycled and reused.

3,970,746

IMMUNOASSAY FOR THE MEASUREMENT OF TOTAL THYROXINE IN BLOOD SERUM

Bhartur Premachandra, 5 Blaytonn Lane, La Due, Mo. 63124, assignor to Bhartur Premachandra, La Due, Mo.

Filed Sept. 5, 1974, Ser. No. 503,230

Int. Cl.² G01N *31/00;* G01T *1/16*

U.S. Cl. 424—1.5 **5 Claims**

1. A radioimmunoassay for the measurement of total thyroxine in a serum sample which comprises the steps of:

mixing trichloroacetic acid and sodium hydroxide with the serum sample to form a mixture;

adding radioactively labeled thyroxine antiserum to the mixture;

permitting the mixture to equilibrate;

placing in contact with the mixture a resin sponge comprising a polyurethane foam of intercommunicating cell type containing a strong base anion exchange resin;

incubating the mixture and resin sponge;

measuring the initial radioactivity of the combined mixture and resin sponge with suitable detecting means;

removing the resin sponge from the mixture;

washing the resin sponge; and

measuring the residual radioactivity in the resin sponge.

3,970,747

HUMECTANT SWEETENER

Jordan B. Barth, East Brunswick, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.

Division of Ser. No. 449,620, March 11, 1974, Pat. No. 3,932,604, which is a continuation-in-part of Ser. No. 317,696, Dec. 22, 1972, abandoned. This application Sept. 22, 1975, Ser. No. 615,336

The portion of the term of this patent subsequent to Jan. 13, 1993, has been disclaimed.

Int. Cl.² A61K *7/16, 7/18*

U.S. Cl. 424—52 **14 Claims**

1. A dentifrice aqueous dental cream toothpaste containing at least about 10% water, requiring and containing a humectant, part of said total humectant comprising a mixture comprising at least about 10% by weight of a solution in water of xylitol in combination with a further polyol humectant, thereby providing said total humectant, said xylitol adapted to function as co-humectant in said dentifrice.

3,970,748

ALUMINUM CHLORHYDROXY GLYCINATE COMPLEXES

Sebastian B. Mecca, Abington, Pa., assignor to Schuylkill Chemical Company, Philadelphia, Pa.

Filed Feb. 24, 1975, Ser. No. 552,316

Int. Cl.² A61K *7/38*

U.S. Cl. 424—68 **4 Claims**

1. An aluminum chlorhydroxy glycinate complex of the formula $[Al_2(OH)_4Cl]_x \cdot [H_2NCH_2COOH]_y$ wherein x and y are each about 1.

3. Antiperspirant-deodorant compositions comprising from about 10 to about 25%, by weight, based on the weight of the composition, of the aluminum chlorhydroxy glycinate complex of claim 1 and a pharmaceutically acceptable carrier.

3,970,749

INTERFERON PRODUCTION

Clarence L. Baugh, 6608 Orlando Ave., Lubbock, Tex. 79413

Filed Apr. 3, 1973, Ser. No. 347,422
Int. Cl.[2] A61K *45/02*
U.S. Cl. 424—85 18 Claims

1. A method of producing interferon which comprises:

a. inoculating with virus a suspension of virus-culture-supporting animal cells, taken directly from trypsinized normal animal tissue, in a nutrient or culture medium without permitting an intervening growth period for the cells in the suspension,

b. maintaining the resulting virus-inoculated suspension in the nutrient or culture medium of virus-culture-supporting animal cells at least until interferon is produced therein, and

c. centrifuging the interferon-containing composition to remove solids therefrom and to collect interferon in thus-obtained centrifugate.

3,970,750

EFFERVESCENT POTASSIUM CHLORIDE COMPOSITION

Eugene W. Brockemeyer, Lincoln, Nebr., and Michael B. Rodell, Santa Ana, Calif., assignors to Sandoz, Inc., E. Hanover, N.J.

Continuation-in-part of Ser. No. 513,041, Oct. 8, 1974, abandoned, which is a continuation-in-part of Ser. No. 358,662, May 9, 1973, abandoned, which is a continuation-in-part of Ser. No. 192,632, Oct. 26, 1971, abandoned. This application May 30, 1975, Ser. No. 582,130
Int. Cl.[2] A61K *31/14*, *31/195*, *33/00*
U.S. Cl. 424—153 22 Claims

1. A method of treating potassium depletion which comprises orally administering to a human being in need of said treatment large doses of potassium chloride in a pleasant tasting effervescent drink resulting from the dissolution in water of a stable pharmaceutical composition in unit dosage form comprising from 500 to 1,500 milligrams of potassium chloride, 500 to 2,000 milligrams of potassium carbonate or bicarbonate, 500 to 2,000 milligrams of a substance which on dissolution in water forms an acid reacting solution, and an amount of L-lysine hydrochloride sufficient to provide one chloride ion for each potassium ion formed by the dissolution of the composition in water.

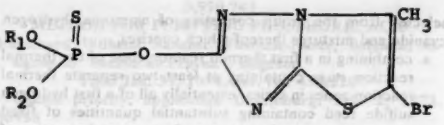
3,970,751

CERTAIN THIAZOLOTRIAZOLYPHOSPHONOTHIOATES USED AS INSECTICIDES

Saburo Kano; Osami Nomura, both of Odawara; Mitsuo Asada, Hiratsuka; Meiki Ando; Michihiko Matsuda, both of Kanagawa; Tomio Yamada; Hitoshi Watanabe, both of Hiratsuka, and Takuzo Taniguchi, Kamakura, all of Japan, assignors to Nippon Soda Company Limited, Tokyo, Japan

Division of Ser. No. 319,490, Dec. 29, 1972, Pat. No. 3,904,639. This application Jan. 30, 1975, Ser. No. 545,307
Int. Cl.[2] A01N *9/36*
U.S. Cl. 424—200 6 Claims

1. A method of preventing injury to plants by phytophagous insects comprising applying to the plants to be protected an insecticidally effective amount of a compound represented by the formula:



in which R_1 and R_2 are each methyl or ethyl.

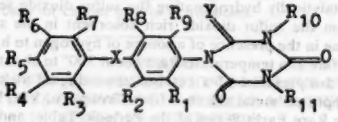
3,970,752

COCCIDIOCIDAL COMPOSITIONS UTILIZING 1-PHENYL-SUBSTITUTED 1,3,5-TRIAZINE

Gerd Aichinger; Axel Haberkorn, both of Wuppertal; Heinrich Kolling, Haan; Eckart Kranz, and Josef Reisdorff, both of Wuppertal, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

Division of Ser. No. 452,140, March 18, 1974. This application Dec. 12, 1974, Ser. No. 532,221
Claims priority, application Germany, Mar. 20, 1973, 2313721
Int. Cl.[2] A61K *31/53*
U.S. Cl. 424—249 43 Claims

1. A pharmaceutical composition useful for the treatment of and prophylaxis against coccidiosis in humans and animals which comprises a therapeutically effective amount of a compound of the formula:



or a pharmaceutically acceptable nontoxic salt thereof wherein

R_1, R_2, R_3, R_4, R_5, R_6, R_7, R_8 and R_9 are the same or different and each is selected from the group consisting of hydrogen, straight or branched chain lower alkyl, halo lower alkyl, lower alkoxy, halo lower alkoxy, lower alkylthio, halo lower alkylthio, halogen, nitro, cyano, amino, lower alkanoylamino, lower alkoxycarbonylamino, carboxy, lower alkoxycarbonyl, carbamoyl, lower alkanoyl, halo

lower alkanoyl, lower alkylsulphinyl, lower alkylsulphonyl, halo lower alkylsulphonyl, and sulphamoyl;

R_{10} is hydrogen, straight or branched chain lower alkyl, cycloalkyl of 3 to 7 carbon atoms, halo lower alkyl, lower alkoxy, lower alkoxy lower alkyl, halo lower alkoxy lower alkyl, lower alkylthio lower alkyl, halo lower alkylthio lower alkyl, lower alkenyl, lower alkynyl, lower alkoxycarbonyl, (lower alkylthio)carbonyl, (lower alkylthio)thiocarbonyl, lower alkanoylamino, succinimido, phthalimido, amino, dilower alkylamino, benzyl, phenyl, or benzyl or phenyl substituted by halogen;

R_{11} is hydrogen or lower alkyl;

X is sulphur, sulphinyl or sulphonyl; and

Y is oxygen or sulphur; in combination with a pharmaceutically acceptable nontoxic inert diluent or carrier.

3,970,753

IMIDAZO[1,2-a]PYRIDINES

Graham John Durant, Welwyn Garden City, England, assignor to Smith Kline & French Laboratories Limited, Welwyn Garden City, England

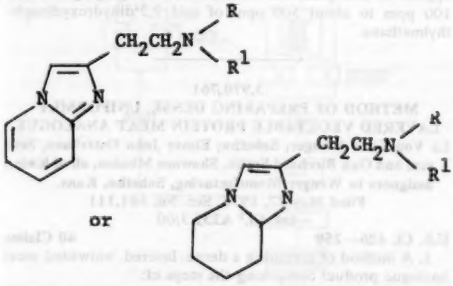
Division of Ser. No. 476,345, June 5, 1974, abandoned. This application July 31, 1975, Ser. No. 600,664

Claims priority, application United Kingdom, June 12, 1973, 27796/73

Int. Cl.² A61K *31/44*

U.S. Cl. 424—263 **5 Claims**

1. A method of stimulting H-1 histamine receptors which comprises administering to an animal in need thereof, in an effective amount to stimulate said receptors, an imidazo-pyridine compound of the formula:



or

wherein R and R^1 may each be hydrogen, methyl or ethyl or a pharmaceutically acceptable acid addition salt thereof.

3,970,754

1,2-DIALKYL-3(OR 3,5)-N-HETEROCYCLIC PYRAZOLIUM SALTS OF DERIVATIVES THEREOF AS FUNGICIDAL AGENTS

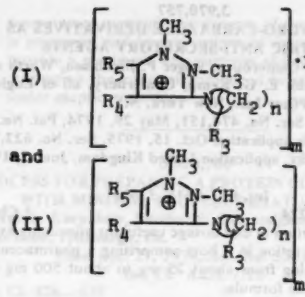
Bryant Leonidas Walworth, Pennington, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Filed Mar. 10, 1975, Ser. No. 556,748

Int. Cl.² A01N *9/22*

U.S. Cl. 424—267 **11 Claims**

1. A method for protecting plants from attack by fungi comprising: applying to said plants a fungicidally effective amount of a compound having a formula selected from the group consisting of:



wherein R_3 represents a member selected from the group consisting of hydrogen, methyl, hydroxy and phenyl; R_4 represents a member selected from the group consisting of hydrogen, and halogen; R_5 represents a member selected from the group consisting of phenyl, cyclohexyl and

X represents an anion with a charge of 1 or 2; *n* is five; *m* represents an integer selected from 1 and 2; and HB is an acid of sufficient strength to form a stable salt with the

group.

3,970,755

BIOCIDAL COMPOSITIONS

Edward George Gazzard, and Michael Singer, both of Manchester, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Apr. 25, 1974, Ser. No. 464,233

Claims priority, application United Kingdom, May 10, 1973, 22353/73

Int. Cl.² A01N *9/12, 9/20, 9/22*

U.S. Cl. 424—270 **5 Claims**

1. A biocidal composition comprising 1,2-benzisothiazolin-3-one and a quaternary ammonium compound selected from the group consisting of lauryl benzyl dimethyl ammonium chloride and cetyl trimethyl ammonium bromide, the molar ratio of 1,2-benzisothiazolin-3-one to quaternary ammonium compound being in the range 1.0: 0.04 to 1.0: 1.0.

3,970,756

MEDICINAL OR COSMETIC COMPOSITION CONTAINING ALLANTOIN GLYCINATE

Sebastian B. Mecca, Abington, Pa., assignor to Schuylkill Chemical Company, Philadelphia, Pa.

Division of Ser. No. 552,315, Feb. 24, 1975, Pat. No. 3,927,021. This application Aug. 8, 1975, Ser. No. 603,194

Int. Cl.² A61K *31/415*

U.S. Cl. 424—273 **1 Claim**

1. A medicinal or cosmetic composition useful for topical application comprising from about 0.2 to about 2%, by weight based on the weight of the composition, of allantoin glycinate of the formula

$$[C_4H_6N_4O_3]_x \cdot [H_2NCH_2COOH]_y$$

where *x* and *y* are each about 1 and a medicinal or cosmetic acceptable carrier.

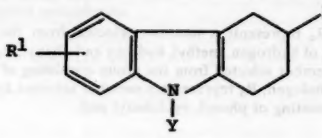
3,970,757

TETRAHYDRO-CARBAZOLE DERIVATIVES AS GASTRIC ANTI-SECRETORY AGENTS

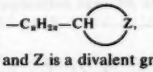
Peter E. Cross, Canterbury; Roger P. Dickinson, Worth near Deal, and John E. G. Kemp, Canterbury, all of England, assignors to Pfizer Inc., New York, N.Y.

Division of Ser. No. 474,151, May 29, 1974, Pat. No. 3,931,222. This application Oct. 15, 1975, Ser. No. 622,798
Claims priority, application United Kingdom, June 2, 1973, 26414/73
Int. Cl.² A61K 31/40
U.S. Cl. 424—274 2 Claims

1. A composition in unit dosage useful for alleviating excess gastric acid secretion in a host comprising a pharmaceutical carrier containing from about 25 mg to about 500 mg of a compound of the formula:



or an N-oxide or a pharmaceutically-acceptable acid addition salt thereof wherein R is alkyl of from 3 to 5 carbon atoms, R^1 is hydrogen, halogen, lower alkyl, lower alkoxy or hydroxy; and Y is aminoalkyl of the formula -Alk-NR^2R^3 in which R^2 and R^3 taken separately are each lower alkyl and R^2 and R^3 taken together with the nitrogen atom to which they are attached form a pyrrolidino, piperidino, perhydroazepino, morpholino, thiomorpholino or 1,1-dioxo-perhydro-1,4-thiazino group and 'Alk' is a divalent alkyl group containing from 2 to 4 carbon atoms; or Y is an aminocyclic group of the formula



in which n is 0 to 3 and Z is a divalent group which completes a pyrrolidine, piperidine or perhydroazepine ring, the nitrogen atom in said ring being separated from the nitrogen atom to which the aminocyclic group is attached by a chain of from 2 to 4 carbon atoms.

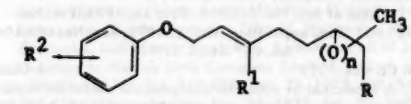
3,970,758

CERTAIN GERANYL PHENYL ETHERS AND THEIR EPOXIDES AND THEIR USE IN CONTROLLING INSECTS

Ferenc M. Pallos, Pleasant Hill; Hwalin Lee, Palo Alto, and Julius J. Menn, Saratoga, all of Calif., assignors to Stauffer Chemical Company, Westport, Conn.

Division of Ser. No. 856,140, Sept. 8, 1969, Pat. No. 3,907,783, which is a continuation-in-part of Ser. No. 815,229, April 10, 1969, abandoned. This application May 19, 1975, Ser. No. 578,580
Int. Cl.² A01N 9/28
U.S. Cl. 424—278 19 Claims

1. A method of controlling Tenebrio molitor comprising applying thereto at any stage of their development a metamorphosis hindering amount of a compound of the formula:



in which R and R^1 are independently methyl or ethyl; *n* is the integer 1; R^2 is hydrogen, halogen, lower alkyl having 1 to 6 carbon atoms, lower alkoxy having 1 to 4 carbon atoms, lower alkenyl having 2 to 6 carbon atoms, lower alkylthio having 1 to 5 carbon atoms, or nitro.

3,970,759

ALIPHATIC DIOLS AS PRESERVATIVES FOR COSMETICS AND RELATED PRODUCTS

John W. Frankenfeld, Atlantic Highlands, N.J., and Donald L. Wright, New York, N.Y., assignors to Exxon Research and Engineering Company, Linden, N.J.

Continuation of Ser. No. 313,781, Dec. 11, 1972, abandoned, which is a continuation-in-part of Ser. No. 67,270, Aug. 26, 1970, abandoned. This application Aug. 19, 1974, Ser. No. 498,651
Int. Cl.² A01N 9/24
U.S. Cl. 424—343 5 Claims

1. A method of inhibiting the growth of public health implicated bacteria, yeasts and molds in cosmetic and personal care preparations containing edible oils and organic nitrogen compounds comprising incorporating in the preparations an effective amount of a linear aliphatic 1,3-diol having 5 to 15 carbon atoms in the molecule, whereby the preparation is preserved against deterioration.

3,970,760

FUNGITOXIC COMPOSITIONS CONTAINING 2,2'-DIHYDROXYDINAPHTHYLMETHANE

Glentworth Lamb, Trenton, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Filed Dec. 20, 1972, Ser. No. 317,043
Int. Cl.² A01N 9/26
U.S. Cl. 424—346 1 Claim

1. A method for the protection of plant materials susceptible to attack by fungi which comprises: applying to the said plant materials a preparation comprising from about 99.99% to about 90% of an inert solid fungicidal carrier selected from the group consisting of clay, pumice, fuller's earth, pyrophyllite and bentonite, and from about 0.01% to about 10% of 2,2'-dihydroxydinaphthylmethane, said preparation being applied to said plant materials at a rate ranging from about 100 ppm to about 500 ppm of said 2,2'dihydroxydinaphthylmethane.

3,970,761

METHOD OF PREPARING DENSE, UNIFORMLY LAYERED VEGETABLE PROTEIN MEAT ANALOGUE

La Von Gene Wenger, Sabetha; Elmer John Osterhaus, Seneca, and Oak Birchard Smith, Shawnee Mission, all of Kans., assignors to Wenger Manufacturing, Sabetha, Kans.

Filed May 27, 1975, Ser. No. 581,111
Int. Cl.² A23J 3/00
U.S. Cl. 426—250 40 Claims

1. A method of preparing a dense, layered, untwisted meat analogue product comprising the steps of:

heating and agitating an admixture comprising a vegetable protein and moisture to an extent sufficient to render the same hot, flowable and substantially unoriented;

moving said admixture under pressure through an elongated processing zone along a generally helical path of travel which simultaneously subjecting the admixture to displacement forces in an axial direction relative to the zone and also transversely of the longitudinal axis thereof, said displacement forces being of a magnitude to assure stretching and working of the protein for permitting subsequent orientation thereof in said product;

thereafter moving said admixture into an elongated processing area without substantially restricting the flow of admixture thereinto and subjecting the latter to displacement forces in said area which are primarily axial relative to the area;

causing the layering of said admixture by maintaining the axial movement thereof in said area while controlling the temperature and pressure therewithin at levels permitting said layering; and

extruding said admixture from said area as a dense, layered meat analogue product.

3,970,762
METHOD OF CHEMICAL PEELING OF FRUITS AND VEGETABLES WITH AN ALKANOLAMINE

Alexandre Askienazy; Georges Melki, both of Paris, and Jean Stevenin, Creteil, all of France, assignors to Compagnie Francaise de Produits Industriels, Asnieres, France

Continuation-in-part of Ser. No. 217,641, Jan. 13, 1972, abandoned. This application Feb. 6, 1974, Ser. No. 439,974

Claims priority, application France, Jan. 28, 1971, 71.02875

Int. Cl.² A23P *1/00*

U.S. Cl. 426—287 **8 Claims**

1. A method for chemical peeling the skin of fruits and vegetables which comprises (1) applying to a fruit or vegetable an aqueous composition comprising from about 0.2 to about 20% by weight of at least one alkanolamine selected from the group consisting of mono-, di-, and tri-alkanolamines, at a temperature of at least about 20°C for from about one to about 30 minutes, to loosen the skin without attacking the pulp, (2) removing the loosened skin from the pulp, and (3) recovering the peeled fruit or vegetable.

3,970,763
HEAT PASTEURIZED CAKE BATTER

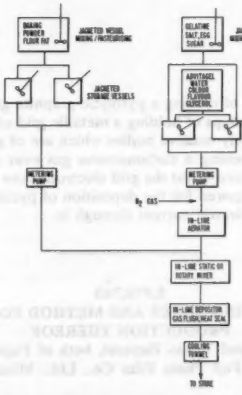
David Patrick Joseph Moran, Potters Bar, England, and Henricus Jacobus Pennings, Oud Beyerland, Netherlands, assignors to Lever Brothers Company, New York, N.Y.

Filed Apr. 9, 1974, Ser. No. 459,502

Claims priority, application United Kingdom, Apr. 11, 1973, 17293/73

Int. Cl.² A21D *2/00*

U.S. Cl. 426—324 **15 Claims**



1. A process for the preparation of a ready-to-bake cake batter having egg, sugar, flour and fat ingredients in conventional proportions comprising:

a. heat-pasteurising an aqueous phase containing the egg in the presence of sufficient sugar to inhibit denaturing the egg by the heat-pasteurising treatment;

b. heat-pasteurising a fat phase containing both the fat and flour by melting the fat and admixing a stream of the flour therewith while maintaining said fat phase at a temperature which is sufficiently high to pasteurise the flour but below the degradation temperature of the flour;

c. aerating the pasteurised aqueous phase with an inert gas at a temperature at which an overrun is induced, to produce a foamed aqueous phase in the presence of a sufficient amount of an edible stiffening agent to stiffen the batter;

d. cooling and blending the fat phase and the foamed aqueous phase together with any remaining ingredients, at a temperature at which the overrun of the aqueous phase is preserved and in proportions of ingredients so as to provide a maximum water activity of 0.85; and

e. packaging the cake mix produced in sealed containers under aseptic conditions.

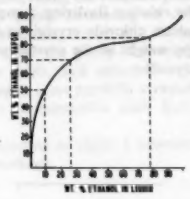
3,970,764
PROCESS FOR PREPARING A PROTEIN CONCENTRATE WITH MINIMAL PROTEIN DENATURATION

George B. Karnofsky, Pittsburgh, Pa., assignor to Dravo Corporation, Pittsburgh, Pa.

Filed Dec. 27, 1974, Ser. No. 536,802

Int. Cl.² A23L *1/20*

U.S. Cl. 426—430 **8 Claims**



1. In a process for treating a seed material with an aqueous solvent which contains an organic component to produce an extract solution and extracted material containing a residue of solvent, wherein desolventizing of said extracted material is accomplished in a desolventizer by direct contacting with a recirculating stream of superheated vapor, the improvement wherein said recirculating stream is a mixture of said organic component and water and having a concentration of organic component greater than the organic component concentration of the aqueous solvent in said residue said recirculating stream of superheated vapor, obtained by mixing vapor originating from said residue of solvent with vapor originating outside the desolventizer.

3,970,765
METHOD FOR PRODUCING SUCROSE FIXED VOLATILE FLAVORS

Esra Pitchon, Flushing; Steven Barry Chall, Monsey, and Marvin Schulman, Monroe, all of N.Y., assignors to General Foods Corporation, White Plains, N.Y.

Filed July 3, 1975, Ser. No. 593,146

Int. Cl.² A23L *1/26*

U.S. Cl. 426—534 **10 Claims**

1. A method for producing a solid flavoring composition containing low levels of volatile flavoring compound comprising the steps of:

a. providing a supersaturated, glassy, aqueous sucrose solution;

b. rapidly cooling the aqueous sucrose solution to a temperature below about 30°F. to cause it to solidify while maintaining it in the glassy state;

c. charging particles of the solidified aqueous sucrose solution and a volatile flavoring compound into a revolving screw fed extruder to cause intimate mixing of the charged materials and to initiate crystallization of the sucrose;

d. expressing the resultant intimate mixture of charged materials from the extruder; and

e. subjecting the extruded mixture to additional mixing for a period of time effective to complete crystallization.

3,970,766

FIXED VOLATILE FLAVORS AND METHOD FOR MAKING SAME

William A. Mitchell, Lincoln Park, N.J.; Howard D. Stahl, Hartsdale, and William C. Seidel, Monsey, both of N.Y., assignors to General Foods Corporation, White Plains, N.Y.

Continuation of Ser. No. 399,201, Sept. 20, 1973, Pat. No. 3,889,008, which is a continuation-in-part of Ser. No. 36,666, May 12, 1970, Pat. No. 3,787,592. This application June 9, 1975, Ser. No. 585,015

Int. Cl.[2] A23L *1/221, 1/232, 1/237*

U.S. Cl. 426—534 2 Claims

1. A method for producing a solid flavoring composition containing low levels of volatile flavor compounds comprising the steps of:

a. forming a supersaturated aqueous solution of sodium chloride, the solution also containing a volatile flavoring composition;

b. crystallizing sodium chloride from the solution to fix the portion of the relative flavoring composition within the individual sodium chloride crystals at a level of less than about 0.5% by weight of the crystal, and thereafter,

c. drying the crystals.

3,970,767

RETORT STARCHES PRODUCTS PREPARED FROM BLENDS OF STARCH AND HIGH AMYLOSE STARCH COMPONENTS

Martin M. Tessler, Edison, and Wadym Jarowenko, Plainfield, both of N.J., assignors to National Starch and Chemical Corporation, Bridgewater, N.J.

Division of Ser. No. 487,013, July 10, 1974. This application Nov. 14, 1975, Ser. No. 631,835

Int. Cl.[2] A23L *1/195, 1/187, 1/40*

U.S. Cl. 426—579 4 Claims

1. A food product adapted for retorting containing as a thickener a cross-linked, hydroxypropylated starch product comprising:

a. 15–85% by weight, of a starch containing at least 50% amylose; and

b. the remainder of the product comprising a starch containing less than 50% amylose;

said product being hydroxypropylated and cross-linked to an extent such that an aqueous dispersion containing 5.0% of said starch product has a Brookfield viscosity measured at 180°F. of less than 2,000 cps. after being cooked at 5.0% starch solids concentration dry basis, in a pH 6.5 buffered salt solution at 212°F. for 10 minutes, followed by 15 minutes at 250°F. and standing at room temperature until it cools to 180°F.; and a Brookfield viscosity measured at 75°F. of greater than 1,500 cps. when said cooked starch is allowed to stand at room temperature for 24 hours; said viscosity measured at 75°F. being at least about five times greater than the viscosity at 180°F.; the degree of hydroxypropylation being such that when the two starch components are blended together prior to being hydroxypropylated, the resulting blend is hydroxypropylated to an M.S. of 0.10–0.30 and when the two starch components are separately hydroxypropylated prior to blending, the starch component containing at least 50% amylose has a hydroxypropyl M.S. of 0.10–0.30 and the starch containing less than 50% amylose has a hydroxypropyl M.S. of 0.06–0.30.

3,970,768

GRID ELECTRODES

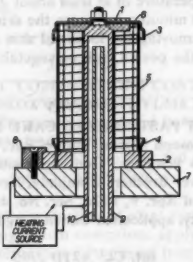
David Mark Wilcox, and William David Richard Rivers, both of Chelmsford, England, assignors to English Electric Valve Company Limited, Chelmsford, England

Filed July 30, 1975, Ser. No. 600,499

Claims priority, application United Kingdom, Aug. 3, 1974, 34307/74

Int. Cl.[2] H01J *1/48;* C23C *11/00*

U.S. Cl. 427—50 6 Claims



1. A method of making a pyrolytic graphite grid electrode comprising the steps of holding a metallic grid electrode core between relatively massive bodies which are of good thermal conductivity, passing a carbonaceous gas over said metallic grid electrode core whilst the grid electrode core is held at the temperature required for the deposition of pyrolytic graphite by passing an electric current through it.

3,970,769

RECORDING SHEET AND METHOD FOR THE PRODUCTION THEREOF

Hajime Kato, and Takao Hayashi, both of Fujimiya, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Oct. 15, 1974, Ser. No. 514,714

Claims priority, application Japan, Oct. 12, 1973, 48-114435

Int. Cl.[2] B41M *5/22;* B32B *27/42, 9/02*

U.S. Cl. 427—145 10 Claims

1. A method for producing a recording sheet comprising admixing a phenol resin selected from a novolak type phenol-aldehyde polymer or a phenol-acetylene polymer and an aqueous emulsion of a hydrophobic material to produce a coating composition and coating the resulting coating composition on a support; said hydrophobic material being selected from the group consisting of a vegetable oil, an animal oil, a mineral oil, a synthetic oil or a hydrophobic organic solvent; said hydrophobic material emulsion being used in an amount of between about 0.1 to 10 parts by weight calculated in terms of the amount of the hydrophobic material per 100 parts by weight of the solid content in the phenool resin coating composition; and said phenol resin being capable of being colored when reacted with an electron donating colorless organic compound.

3,970,770

WIRE COATED WITH FLUOROCARBON POLYMERS CROSS-LINKED WITH DIALYL ESTER OF 4,4'-DICARBOXYDIPHENYL ESTER

Kewal Singh Dhami, Shrewsbury, Mass., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Nov. 29, 1974, Ser. No. 528,020
Int. Cl.² B32B *15/00*; C08L *53/00*
U.S. Cl. 428—379 1 Claim

1. A wire coated with an irradiation crosslinked composition comprising a fluorocarbon polymer and the diallyl ester of 4,4'-dicarboxydiphenyl ether.

3,970,771

SUBSTRATE COATED WITH MIXED RESIN PRIMER COAT COMPRISING A BLOCK COPOLYMER

Sol Davison, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Nov. 25, 1974, Ser. No. 526,882
Int. Cl.² B32B *27/08*, *27/32*, *27/36*, *27/40*
U.S. Cl. 428—425 5 Claims

1. A coated article of manufacture comprising a substrate surface bearing a primer coat and a top coat, said primer coat being adherent both to the substrate and the top coating, wherein said primer coat contains no oil component and comprises:

a. a selectively hydrogenated block copolymer having at least two polymer blocks A and at least one polymer block B, each block A being a non-elastomeric polymer block of a monoalkenyl arene having an average molecular weight between about 2,000 and about 125,000 and each block B being a hydrogenated polymer block of a conjugated diene wherein at least 80% of the double bonds have been reduced by hydrogenation and wherein block B has an average molecular weight between about 10,000 and 250,000;

b. 50–150 parts by weight per 100 parts by weight of said block copolymer of a first resin being compatible with the blocks A in the proportions employed, wherein said first resin is selected from the group consisting of coumarone-indene resins, olefinic hydrocarbon resins, rosin methyl ester, vinyl toluene/alphamethyl styrene copolymer, alphamethyl styrene copolymer, polyindene resin, and poly(methyl indene)resin; and

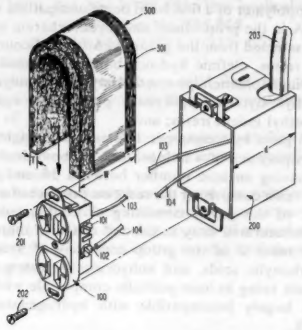
c. 50–150 parts by weight per 100 parts by weight of said block copolymer of a halogen-free carboxylated second resin, having an acid number between 15 and 60, said second resin comprising the reaction product of a component C of the group consisting of conjugated dienes, rosin, unsaturated fatty acids, and mixtures thereof with a component D of the group consisting of unsaturated polycarboxylic acids, and anhydrides or esters thereof, said resin being at least partially compatible with blocks A and largely incompatible with hydrogenated diene block B.

4. An article according to claim 1 wherein the top coating comprises a polyurethane.

3,970,772
METHOD AND APPARATUS FOR SEALING AN ELECTRICAL RECEPTACLE

Hyde W. Ballard, Barto, Pa. 19504

Filed Aug. 7, 1975, Ser. No. 602,565
Int. Cl.² H02G *3/08*
U.S. Cl. 174—53 **5 Claims**

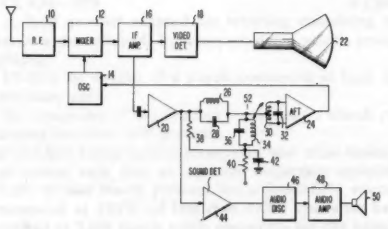


3. In combination, an electrical outlet box; an electrical receptacle affixed to the outlet box; a strip of insulating material sandwiched between the electrical outlet box and the electrical receptacle in such a manner that the insulating material prevents the passage of air through the completed assembly.

3,970,773
FREQUENCY SELECTIVE CIRCUIT FOR AUTOMATIC FREQUENCY CONTROL AND SOUND SIGNALS

Max Ward Muterspaugh, Indianapolis, Ind., assignor to RCA Corporation, New York, N.Y.

Filed Aug. 18, 1975, Ser. No. 605,592
Int. Cl.² H04N *5/44*, *5/62*
U.S. Cl. 178—5.8 R **6 Claims**



1. In a television receiver receptive to composite video signals including modulated sound and picture carrier components and having an intercarrier intermediate frequency amplifier for amplifying both sound and picture component signals, said amplifier having a bandwidth suitable for passing said modulated sound and picture carrier components, apparatus providing a desired response to said sound and picture carrier components and providing an automatic fine tuning voltage comprising:

amplifier means for receiving intermediate frequency signals including modulated audio and video carrier components;

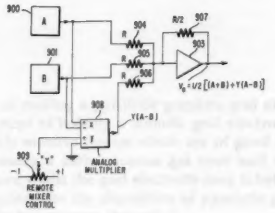
discriminator means including a first resonant circuit having a resonance at a frequency substantially equal to said picture carrier frequency and receptive to signals provided by said amplifier means for providing automatic fine tuning signals responsive to picture carrier frequency deviation from said resonant frequency; and

a second resonant circuit interposed in series between said amplifier means and said discriminator means having a resonance at a frequency lower than said sound carrier frequency for providing a greater impedance loading upon said amplifier means at frequencies away from said resonance than near said resonance, said impedance loading causing said amplifier means to provide a lower gain for signals removed from said resonance than for those close to said resonance.

3,970,774
ELECTRONIC SIGNAL MIXER

Lucas John Bazin, Stratford, and Gary Ray Peterson, Runnemede, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Mar. 31, 1975, Ser. No. 563,683
Int. Cl.² H04N *5/14*, *5/20*, *5/22*
U.S. Cl. 178—6 **9 Claims**



1. A signal mixer comprising:

a pair of terminals for receiving first and second signals respectively;

first combining means coupled to said pair of terminals for providing an additive combination of said first and second signals;

a multiplier having a first input circuit coupled to said pair of terminals, a second input circuit for connection to a source of control voltage, and an output circuit for developing an output signal which is an additive combination of said first and second signals multiplied by a coefficient determined by said control voltage;

second combining means coupled to said first combining means to receive the additive combination of said first and second signals, and coupled to said multiplier output circuit to receive the additive combination of said first and second signals multiplied by said coefficient, one of said additive combinations of said first and second signals produced by said first combining means and said multiplier comprising the difference between said first and second signals and the other of said additive combinations comprising the sum of said first and second signals.

3,970,775

SYSTEM FOR SCANNING INFORMATION RECORDED ON A PLURALITY OF MAGAZINE CONTAINED FILMSTRIPS

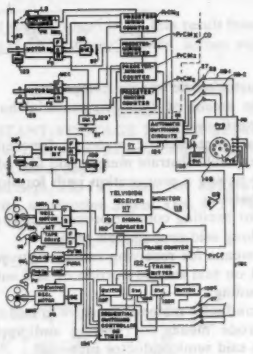
Jerome H. Lemelson, 85 Rector St., Metuchen, N.J. 08840

Continuation-in-part of Ser. No. 295,807, Oct. 10, 1972, Pat. No. 3,881,053, which is a continuation-in-part of Ser. No. 224,131, Feb. 7, 1972, Pat. No. 3,699,266, and a continuation-in-part of Ser. No. 142,748, Aug. 28, 1961, Pat. No. 3,646,258, which is a division of Ser. No. 515,417, June 14, 1955, Pat. No. 3,003,119. This application Nov. 5, 1974, Ser. No. 521,028

The portion of the term of this patent subsequent to Feb. 29, 1989, has been disclaimed.

Int. Cl.[2] G11B 7/00; H04N 7/18

U.S. Cl. 178—6.8 12 Claims



12. An apparatus for storing and viewing information comprising in combination:

a plurality of magazines each containing a filmstrip having a tandem array of frames of recordings provided along its length,

first means for retaining said magazines in a predetermined side-by-side array adjacent to each other,

second means for engaging the filmstrip of a selected magazine and driving said filmstrip,

third means for effecting controlled relative movement between said second means and said first means to bring said second and first means into alignment with each other and to align the filmstrip of a selected magazine with said second means,

fourth means for controlling said second means to operatively engage the filmstrip of a selected magazine when said second means is aligned with said filmstrip,

fifth means associated with said second means and movable therewith for power driving said second means and causing said second means to move said filmstrip in a fixed path,

sixth means for scanning said filmstrip as it is moved in said fixed path by said second means, said sixth means being modulateable by the recordings along said filmstrip for generating output energy representative of said filmstrip information, and

seventh means for receiving said output energy and displaying information recorded on said filmstrip in a visually monitorable form.

3,970,776

SYSTEM FOR CONVERTING THE NUMBER OF LINES OF A TELEVISION SIGNAL

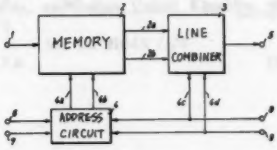
Koji Kinuhata, Tokyo; Kitsutaro Amano, Yokohama; Hiroshi Sasaki, Nagareyama; Hideo Yamamoto, Sagamihara; Kosho Shibata, Niza, and Kazuo Yamada, Tokyo, all of Japan, assignors to Kokusai Denshin Denwa Kabushiki Kaisha, Japan

Filed May 22, 1974, Ser. No. 472,505

Claims priority, application Japan, May 24, 1973, 48-57159

Int. Cl.[2] H04N 5/02

U.S. Cl. 178—6.8 2 Claims



1. A system for converting the number of lines of an input television signal having frames each formed by two adjacent interlaced fields, comprising:

input terminal means for receiving said input television signal;

memory means connected to said input terminal means for successively storing said input television signal;

first synchronizing terminal means for receiving horizontal synchronizing pulses and vertical synchronizing pulses of said input television signal;

second synchronizing terminal means for receiving horizontal synchronizing pulses and vertical synchronizing pulses of an output television signal to be obtained;

address circuit means connected to said memory means, said first synchronizing terminal means and said second synchronizing terminal means for performing the write-in operation to the memory means in response to said horizontal synchronizing pulses and said vertical synchronizing pulses of the first synchronizing terminal means and for performing the read-out operation from the memory means in response to said horizontal synchronizing pulses and said vertical synchronizing pulses of said second synchronizing terminal means;

line combiner means connected to said memory means and said second synchronizing terminal means for forming each interlaced frame of said output television signal by signals of two adjacent fields of said input television signal read-out from said memory means in response to said horizontal synchronizing pulses and said vertical synchronizing pulses of said second synchronizing terminal means under a condition where signals of each field of said each frame of said output television signal are formed by sequentially weighting and combining line signals of the former and the latter of the two fields of said input television signal so that the order of lines is not reversed in said output frame while the lines are not repeated in the same field; and

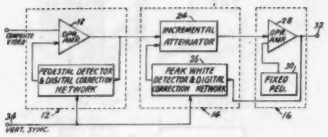
output terminal means connected to said line combiner means for obtaining said output television signal.

3,970,777

APPARATUS FOR ADJUSTING VIDEO PEDESTAL AND PEAK WHITE LEVEL

Robert S. Bradford, Woodland Hills, and Peter Amass, Camarillo, both of Calif., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed June 9, 1975, Ser. No. 585,102
Int. Cl.² H04N 5/16
U.S. Cl. 178—7.1 17 Claims



1. A video compensation network for automatically adjusting a received composite video signal comprising

pedestal adjustment means having a feedback loop for processing a composite video signal to automatically maintain the pedestal level of a thus processed composite video signal at a desired pedestal level, and

video gain adjustment means having a feedback loop for automatically maintaining the peak white level of said processed composite video signal at a desired level,

the improvement wherein

said pedestal adjustment means comprises

a. means for detecting the pedestal level of said processed video signal,

b. means activated by a vertical sync signal associated with said received composite video signal for comparing said detected pedestal level with a desired pedestal level to produce a digital pedestal control signal which is adjusted not more than one increment once each video field, and for producing a first feedback signal corresponding to said pedestal control signal, and

means for combining said first feedback signal together with said received composite video signal to produce as a said processed video signal a stripped video signal having a zero pedestal level and a peak black level at approximately ground potential, wherein

said video gain adjustment means comprises

means for detecting the peak white level of said processed video signal,

means activated by said vertical blanking signal for comparing said detected peak white level with a desired peak white level to produce a digital gain control signal which is adjusted not more than one increment each video field, and for producing a second feedback signal corresponding to said gain control signal, and

means for further processing said processed video signal in response to said second feedback signal such that the maximum excursion of said processed signal is automatically maintained within a predetermined range, and wherein

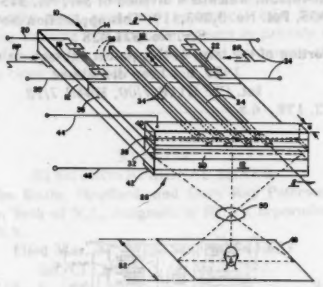
said network further comprises means for adding blanking pulses having a predetermined amplitude to said automatically maintained processed video signal to provide a compensated composite video signal in which the pedestal level and video gain may each be independently automatically adjusted upon each vertical blanking pulse.

3,970,778

MONOLITHIC ACOUSTOELECTRIC IMAGE PICK-UP DEVICE

Larry R. Adkins, Tustin, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed June 18, 1975, Ser. No. 588,102
Int. Cl.² H04N 5/30
U.S. Cl. 178—7.1 9 Claims



1. An acoustoelectric imager comprising:

a. substrate means of dielectric material having first and second portions;

b. a film of piezoelectric material disposed on the first portion of said substrate means, said film of piezoelectric material having a propagation path for surface acoustic waves thereon;

c. means for exciting counter-propagating surface acoustic waves along said propagation path;

d. screen means for receiving radiation projected thereon disposed on said second portion of said substrate means and including:

1. semiconductor material sensitive to said radiation; and

2. electrode means for sensing and applying voltage across said semiconductor material;

3. wherein every part of said screen means and said substrate means interposed in a beam path for projected radiation intended to illuminate said semiconductor material is transparent to the projected readiation; and

e. multistrip coupler means for sensing electric fields associated with surface acoustic waves on said propagation path and for causing said electric fields to interact with charge carriers in said semiconductor material.

3,970,779

POWER SUPPLY CIRCUIT

Shigenori Takahashi, Yokohama, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed July 17, 1974, Ser. No. 489,083
Claims priority, application Japan, July 24, 1973, 48-83275
Int. Cl.² H04N 5/44
U.S. Cl. 178—7.3 R 5 Claims

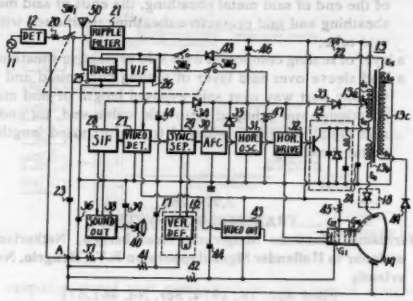
1. A power supply circuit for supplying stabilized direct currents to at least first and second load circuits comprising:

A. a direct current source means having a pair of output terminals and being operative to produce a DC voltage between said terminals,

B. means connecting said first and second load circuits in series to each other between said pair of output terminals of said direct current source means so that said first and second load circuits have respective DC voltages applied thereacross in dependence on their respective impedances, and

C. control means connected to said first load circuit for producing an additional direct current varying in response to variations in the DC voltage applied across said first load circuit, said control means being connected to said second load circuit for applying said additional direct

current in series with the direct current from said direct current source means to said second load circuit to compensate for the variations in the DC voltage applied



across said second load circuit that result from said variations in said DC voltage applied across said first load circuit.

3,970,780

CONSTANT-VOLTAGE POWER SUPPLY

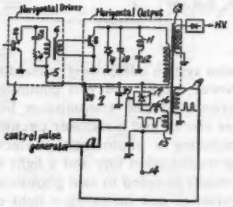
Nobuo Minoura, Ootawara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Sept. 28, 1973, Ser. No. 401,847

Claims priority, application Japan, Oct. 4, 1972, 47-99613; May 17, 1973, 48-55097

Int. Cl.² H04N 3/18

U.S. Cl. 178—7.3 R 6 Claims



1. A constant-voltage power supply circuit for use in the horizontal deflection circuit of a television receiver comprising;

a source of non-stabilized DC input voltage;

voltage-controlled semiconductor gating means having an input and an output;

means for supplying said non-stabilized DC input voltage to the input of said semiconductor means;

means for generating a DC output voltage at the output of said semiconductor gating means, the amplitude of said DC output voltage being a function of the conduction period of said semiconductor gating means;

means for extracting flyback pulses of a substantially constant frequency from the horizontal deflection circuit of said television receiver;

control means for detecting amplitude variations in said DC output voltage and producing control pulses, said control pulses being delayed in phase from said flyback pulses as a function of the amplitude of said DC output voltage;

means for applying said flyback pulses to both said voltage-controlled semiconductor gating means and said control means, said flyback pulses applied to said semiconductor gating means biasing said semiconductor gating means out of conduction, said flyback pulses applied to said control means providing a pulse train from which said control pulses are generated in conjunction with the amplitude of said DC output voltage;

means for applying said control pulses to said voltage-controlled semiconductor gating means to bias said semiconductor means into conduction;

whereby the conduction period of said semiconductor gating means is a function of said delay in phase of said control pulses from said flyback pulses thereby regulating and stabilizing the DC output voltage.

3,970,781

APPARATUS FOR MAINTAINING THE POSITION OF A WORKING HEAD IN RELATION TO A CYLINDRICAL WORKPIECE

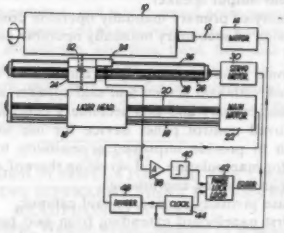
Brian L. Dalton, London, and Edward J. Judd, Hemel Hempstead, both of England, assignors to Crosfield Electronics Limited, London, England

Filed Aug. 21, 1975, Ser. No. 606,571

Claims priority, application United Kingdom, Aug. 22, 1974, 36974/74

Int. Cl.² H04N 1/24

U.S. Cl. 178—7.6 10 Claims



1. Apparatus for scanning the cylindrical surface of a cylinder or of a sheet wrapped around the cylinder with a laser beam, the cylinder being mounted for rotation about its axis, comprising:

a scanning head including a laser;

a lens head comprising an aperture and a focusing lens positioned for focusing the beam of the said laser on to the said cylindrical surface;

a driving system for rotating the cylinder and including first and second driving means for moving the scanning head and lens head, simultaneously with the cylinder rotation, along first and second paths, respectively, each path being parallel to the axis of the cylinder so that the scanning head acts through the focusing lens to move the laser beam along the said cylindrical surface in a direction parallel to the cylinder axis and the beam traces a helical path on the rotating cylinder, the first and second driving means being constructed so that the rate of movement of the lens head by the second driving means is more uniform than that of the scanning head by the first driving means;

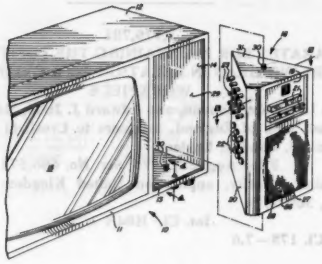
the lens head and the scanning head being mounted to permit, during such movement in a direction parallel to the cylinder axis, relative movement between them in the said direction to accommodate differences in their rates of movement, the size of the said lens head aperture and the extent of the said permitted relative movement being such that the laser beam always passes through the lens aperture during operation of the driving system.

3,970,782

MODULAR CONTROL PANEL DEVICE FOR AUDIO-VISUAL RECEIVING APPARATUS

Kenneth R. Fenne, Glen Ellyn, Ill., assignor to Quasar Electronics Corporation, Franklin Park, Ill.

Filed May 2, 1975, Ser. No. 573,855
Int. Cl.² A47B 81/06; H04B 1/08; H04N 5/645; H05K 5/02
U.S. Cl. 178—7.9 16 Claims



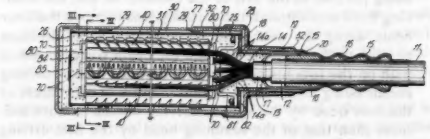
1. In an audio-visual receiving apparatus which includes
a cabinet having top, bottom and side panels,
a visual display screen,
an audio output speaker,
a plurality of primary manually operable control devices,
a plurality of secondary manually operable control devices, and
electronic receiving, amplifying and control circuitry associated with said screen and said speaker and responsive to said primary and said secondary control devices,
an improved control panel device for use in combination therewith to provide improved accessibility to said control devices for manipulation and servicing thereof, said improved control panel device comprising:
a. a base pivotally carried by said cabinet;
b. a first panelboard extending from said base and having said primary control devices arranged thereon; and
c. a second panelboard extending from said base and having said secondary control devices arranged thereon.

3,970,783

LOADING COIL CASE AND CABLE CONNECTION FOR COMMUNICATIONS CABLES

Helmut H. Lukas, Carleton Place, Canada, assignor to Northern Electric Company Limited, Montreal, Canada

Filed Sept. 22, 1975, Ser. No. 615,548
Int. Cl.² H01F 17/08
U.S. Cl. 178—46 3 Claims



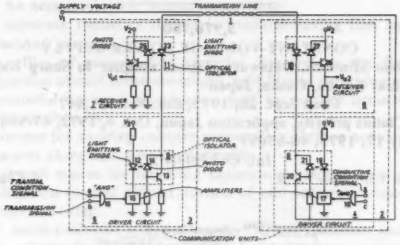
1. A loading coil case and cable end connection assembly, comprising:
a loading coil case including an inlet tube assembly at an inlet end, said inlet tube assembly including an end plate and a tube extending from said end plate;
a cable end entered into said tube, the cable end including a metal sheathing around conductors of the cable and a protective sheating around said metal sheathing;
said metal sheathing removed at said cable end for a length to expose the conductors, the conductors entering the casing and connected to loading coils in said case;
said protective sheathing removed to expose a short length of the end of said metal sheathing, the ends of said metal sheathing and said protective sheathing positioned within said tube;
a layer of sealing compound over said protective sheathing;
a lead sleeve over said layer of sealing compound and extending part way over said exposed length of said metal sheathing, and crimped onto said cable end, an end of said metal sheathing soldered to said exposed length of metal sheathing.

3,970,784

TRANSMISSION SYSTEM

Hermanus Martinus Meijerink, Haaksbergen, Netherlands, assignor to Hollandse Signaalapparaten B.V., Hengelo, Netherlands

Filed Apr. 18, 1974, Ser. No. 461,871
Claims priority, application Netherlands, May 3, 1973, 7306137
Int. Cl.² H04L 25/02
U.S. Cl. 178—58 A 4 Claims



1. A transmission system comprising: a transmission line; a unidirectional power supply and two communication units connected in series with said transmission line; each unit including a driver circuit and a receiver circuit; at least one driver circuit including a photosensitive electronic device connected in the transmission line and a light emitting electronic device optically coupled to said photosensitive device; at least one receiver circuit including a light emitting electronic device connected in the transmission line; and control means coupled to each driving circuit for controlling conductive condition of the photosensitive device in said one driving circuit and for maintaining conductive condition in the other driving circuit.

3,970,785

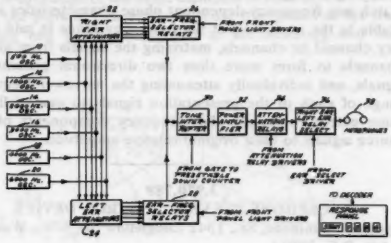
TONE COUNT AUDIOMETRIC COMPUTER

Charles R. Meyer, San Antonio, Tex., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed May 13, 1975, Ser. No. 577,133
Int. Cl.² H04R 29/00
U.S. Cl. 179—1 N 9 Claims

1. A tone count audiometric computer apparatus comprising in combination:
a tone generating means for providing a plurality of different frequency tones, said tone generating means being controllable in frequency tone level, said tone generating means being programable as to the ear to be tested,
a logical control means connected to said tone generating means for controlling said frequency tone level, said logical control means selecting the frequency tones to be applied to the ear under test, said logical control unit providing an ear-select signal to said tone generating

means to test a particular ear, said logical control means providing a tone interrupt signal to said tone generating means to provide a plurality of different tone burst to said ear under test, and



a response panel unit connected to said logical control means to record the number of different tone bursts heard, said response panel unit having a start testing sequence control signal, said response panel unit having a testing ready indication and a listen indication.

3,970,786

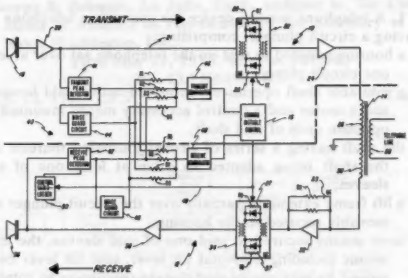
LOUDSPEAKING TELEPHONE WITH IMPROVED RECEIVE SENSITIVITY

Uno Randmere, Victor, N.Y., assignor to Stromberg-Carlson Corporation, Rochester, N.Y.

Continuation-in-part of Ser. No. 483,591, June 27, 1974. This application Oct. 21, 1974, Ser. No. 516,333

Int. Cl.² H04M *1/60, 9/08*

U.S. Cl. 179—1 VC **5 Claims**



1. In a loudspeaking telephone system including transmission and receiving channels, a control circuit for switching between said transmission and receiving channels, selection control means responsive to transmit and receive seizure commands for effectively selecting between said transmission and receiving channels, respectively, by degrading the gain of the unselected channel, input control means for producing said receive seizure commands and said transmit seizure commands, said input control means including receive comparator means and transmit comparator means responsive to receive trigger signals and transmit trigger signals, respectively, for producing, respectively, receive and transmit seizure commands, and passive receive and transmit summing means, having output lines connected to said receive and transmit comparator means, respectively, and each being connected to directly compare the signal levels in both of said transmission and said receiving channels, said receive summing means being arranged to generate over its output line a receive trigger signal when the signal level in said receiving channel exceeds the signal level in said transmission channel by a predetermined amount of said transmit summing means being arranged to generate over its output a transmit trigger signal when the signal level in said transmission channel exceeds the signal level in said receiving channel by said predetermined amount, the improvement comprising:

transmit noise guard circuit means connected to the transmit summing means and to the receive summing means for substantially cancelling ambient noise parameters in said transmission channel, and

receive noise guard circuit means connected to the transmit summing means and to the receive summing means for substantially cancelling noise parameters and a hybrid parameter in said receiving channel, said receive and transmit summing means each comprising a plurality of unequal impedances connected to perform an analog addition of the signal levels in said transmission and receiving channels across each said summing means, said unequal impedances being further connected to perform an analog addition of signals produced by said transmit and receive noise guard circuit means across each said summing junction, said transmit channel being connected to said transmit summing means by a first impedance, said receive channel signal being connected to said transmit summing means by a second impedance, said transmit noise guard circuit signal being connected to said transmit summing means by a third impedance, said receive noise guard circuit signal being connected to said transmit summing means by a fourth impedance, said receive channel signal being connected to said receive summing means by a fifth impedance, said transmit channel signal being connected to said receive summing means by a sixth impedance, said receive noise guard circuit signal being connected to said receive summing means by a seventh impedance, and said transmit noise guard circuit signal being connected to said receive summing means by an eighth impedance, said first, third, fifth and seventh impedances being equal to each other, said second, fourth, sixth and eighth impedances being equal to each other, and said first impedance being greater than said second impedance.

3,970,787

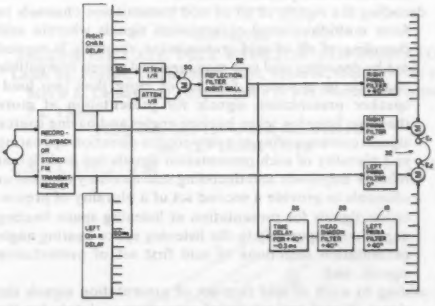
AUDITORIUM SIMULATOR AND THE LIKE EMPLOYING DIFFERENT PINNA FILTERS FOR HEADPHONE LISTENING

Campbell L. Searle, Weston, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Feb. 11, 1974, Ser. No. 441,259

Int. Cl.² H04R *5/04*

U.S. Cl. 179—1 AT **15 Claims**



1. For use with an auditorium simulator for sound performances having an input for the signal to be played and outputs for right and left transducers that are closely associated with the respective ears of the listener, listener simulating means comprising pinna response simulating circuitry having characteristics simulating differences between the left and right pinnas of a listener for modifying said signal and applying to said right and left transducers outputs in the form of different direction signifying transforms in accordance with the effect

of the listener being disposed in the auditorium being simulated, the output of said pinna response simulating circuitry corresponding as a function of amplitude and frequency to the binaural pinna disparity auditory localization cue of the listener.

3,970,788

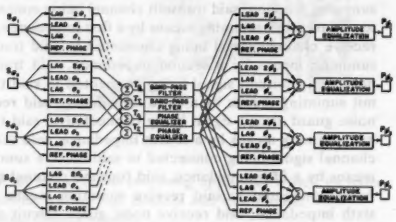
MONAURAL AND STEREO COMPATIBLE MULTIDIRECTIONAL SOUND MATRIXING

Duane H. Cooper, 918 W. Daniel St., Champaign, Ill. 61820

Division of Ser. No. 288,873, Sept. 13, 1972, Pat. No. 3,906,156, and a continuation-in-part of Ser. No. 187,065, Oct. 6, 1971, Pat. No. 3,856,992. This application May 16, 1975, Ser. No. 578,078

Int. Cl.² H04R 5/00

U.S. Cl. 179—1 GQ **7 Claims**



1. In the method of audio reproduction wherein multidirectional source signals are transmitted in two channels adapted for monaural and stereo loudspeaker presentation and having the multidirectional signals encoded in said two channels with predetermined amplitude and phase relations indicative of source directions and adapted to be decoded for formation from the signals in said two channels of more than two loudspeaker presentation signals having source signals corresponding to every source direction appearing in a plurality of such presentation signals but in differing relative amplitude, the improvement comprising

transmitting said multidirectional source signals encoded in at least one auxiliary channel with predetermined amplitude and phase relations differently indicative of source directions relative to the amplitude and phase relations of the multidirectional signals encoded in said two monaural and stereo compatible channels,

decoding the signals of all of said transmission channels to form multidirectional presentation signals wherein said decoding of all of said transmission channels is carried out by decoding said two monaural and stereo compatible channels to provide a first set of more than two loudspeaker presentation signals for presentation at more than two listening space bearing angles and having source signals corresponding to every source direction appearing in a plurality of such presentation signals but in different relative amplitude and decoding said auxiliary channel or channels to provide a second set of a plurality of presentation signals for presentation at listening space bearing angles corresponding to the listening space bearing angle presentation directions of said first set of presentation signals, and

adding to each of said first set of presentation signals the signal of said second set of presentation signals for the corresponding listening space bearing angle to provide a plurality of output signals for the presentation directions corresponding to the presentation directions of said first set of presentation signals but with a sharpened directionality pattern with respect to that of said first set of presentation signals.

6. A method of audio reproduction of multidirectional source signals comprising the steps of transmitting the source signals encoded in two basic transmission channels and also transmitting a limited frequency range of the source signals in at least one auxiliary transmission channel having a frequency range substantially narrower than the first two channels and corresponding to said limited source signal range, phase compensating the signals in said first two transmission channels to match any frequency-dependent phase characteristics attributable to the narrowing of the frequency range in said auxiliary channel or channels, matrixing the signals from all said channels to form more than two directional presentation signals, and individually attenuating the narrower frequency range of each of the presentation signals to essentially the same extent to restore the frequency components of said source signals to their original relative amplitude.

3,970,789

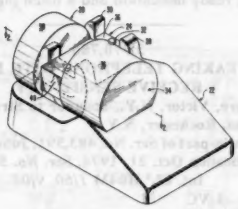
TELEPHONE SERVICE CONTROL DEVICE

Ryden R. Simmons, Sr., 1342 Longfellow St., NW., Washington, D.C. 20011

Filed Jan. 15, 1975, Ser. No. 541,201

Int. Cl.² H04M 1/66

U.S. Cl. 179—1 HS **2 Claims**



1. A telephone service device for use with a telephone set having a circuit plunger, comprising:

a housing adapted to seat on the telephone set over at least one circuit plunger;

a rotatable shaft operatively mounted within said housing, and a motor and a control accessory means mounted on opposite ends of said shaft;

the shaft having a series of sleeves journaled thereon and the shaft being adapted to drive at least one of said sleeves;

a lift frame extending partially over the circuit plunger and movably secured to the housing;

lever means secured to said one of said sleeves, the lever means including a pivotal tilt lever, said tilt lever being moved by said one of said sleeves responsive to rotation of said shaft and contacting the circuit plunger to depress the same, and contacting the lift frame to vertically move said frame; and

a bail secured to another of the sleeves and to the lift frame to effect upward or downward movement of the lift frame responsive to rotation of the sleeve.

3,970,790

METHOD AND DEVICE FOR THE CODED TRANSMISSION OF MESSAGES

Gustav Guanella, Zurich, Switzerland, assignor to Patelhold Patentverwertungs & Elektro-Holding AG, Glarus, Switzerland

Filed Mar. 7, 1974, Ser. No. 448,977

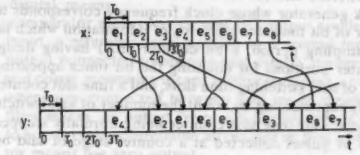
Claims priority, application Switzerland, Mar. 19, 1973, 3876/73

Int. Cl.² H04K 1/06

U.S. Cl. 179—1.5 S **41 Claims**

1. A method for the enciphered transmission of messages by splitting up the clear signals to be transmitted into elements of equal length T_o, which are transposed at the transmitting end by being delayed by at least partially unequal times and are

re-transposed at the receiving end by being further delayed by at least partially unequal times, said method comprising the steps of transposing a pair of elements at a time, which elements have a specific mutual spacing, at the transmitting end, and re-exchange of the same elements in pairs at the receiving end, the pairs of elements which are transposed at the transmitting end and re-transposed at the receiving end being



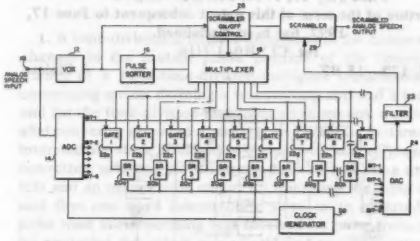
determined by providing irregular trains of control pulses which are identical at the transmitting and receiving ends, and delaying those elements which do not belong to the pairs of elements by a fixed time T at the transmitting and receiving ends, and delaying the element of each pair arriving first at the transmitting end and at the receiving end by double the time 2T and passing the second element of the pair without delay.

3,970,791

VOICE CONTROLLED DISAPPEARING AUDIO DELAY LINE

George B. Johnson, La Jolla, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 27, 1975, Ser. No. 581,060
Int. Cl.² H04M *1/70*
U.S. Cl. 179—1.5 S **9 Claims**



1. A voice-controlled disappearing audio delay apparatus for use with a voice scrambler transmitter, the combination comprising:

a. input means for receiving voice generated signals;

b. first means coupled to said input means for delaying the incoming voice signal for a predetermined time duration equal to the time required for a scrambler preamble to be transmitted,

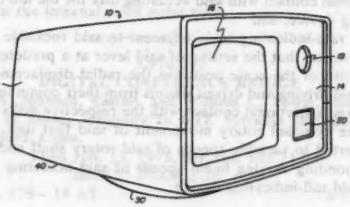
c. second means coupled to said input means and to said first means for incrementally removing the delay of the voice signal in response to pauses of predetermined time durations in said voice generated signals.

3,970,792

ADJUSTABLE MOUNTING STRUCTURE FOR VIDEO TELEPHONE UNIT

Edward Edmund Benham, Greenwich; Walter A. Menn, Stamford, both of Conn.; Douglas M. Spranger, Brooklyn, and Malcolm J. Brookes, New York, both of N.Y., assignors to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Feb. 18, 1975, Ser. No. 550,844
Int. Cl.² H04M *1/04*
U.S. Cl. 179—2 TV **6 Claims**



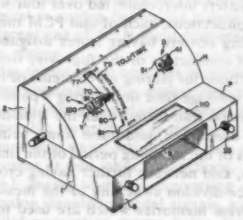
1. An adjustable mounting base for a video telephone terminal comprised of an enlarged housing having a viewing face in one side thereof, said base being adapted to rest on a generally horizontal surface, the base including a pedestal having an enlarged surface adapted to rest on the horizontal surface, a recess in said central portion of said pedestal, said recess having a circular periphery, an insert member fitted in said recess, said insert member including a basal portion mating with said recess to allow rotation of said insert member relative to said base, a socket of rectangular cross section in said insert member, said socket terminating in opposed shoulders at the extreme ends of said socket, a rocker member including an arcuate lower wall, means mounting said rocker member to the underside of said housing with the arcuate wall extending downwardly therefrom, said rocker member resting in said socket with the arcuate wall of said member engaging the shoulders of said socket to enable manually settable inclination of the viewing face of said housing, said rocker to shoulder engagement frictionally holding said terminal in an inclination and said insert member enabling rotation of said housing viewing face.

3,970,793

TELEPHONE-CALL TOLL MONITOR AND INDICATOR

Leslie M. Profitt, 147 Sunset Court, Monroe, Ohio 45050, and Merle E. Lehmer, Jr., 810 Melody Drive, North Huntingdon, Pa. 15642

Filed Oct. 25, 1974, Ser. No. 518,169
Int. Cl.² H04M *15/18*
U.S. Cl. 179—7.1 R **25 Claims**



16. A telephone-call toll indicating apparatus comprising

a. a timing mechanism,
b. a disk adapted to be driven at a constant speed by said timing mechanism,
c. a rotary toll-indicating device having an actuating disk spaced from said first-mentioned disk for rotation on a common rotary axis,
d. a rockable setting lever adjustably mounted for pivotal movement between said disks and provided with a rotary shaft extending in opposite directions from the longitudinal axis of said setting lever,
e. a drive wheel at one end of said shaft adapted for frictional contact with said first-mentioned disk,
f. a driven wheel at the opposite end of said shaft in frictional contact with said actuating disk for the toll indicating device, and
g. a rate-indicating scale adjacent to said rockable setting lever so that the setting of said lever at a predetermined point of the scale positions the radial displacements of said driving and driven wheels from their common rotary axis in frictional contact with the respective disks so that the constant rotary movement of said first disk is converted to variable speeds of said rotary shaft and corresponding varying lineal speeds of said actuating disk of said toll-indicating device.

3,970,794

PCM TIME-DIVISION MULTIPLEX TELECOMMUNICATION NETWORK

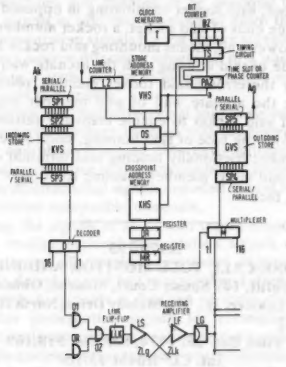
Karlheinz Neufang, Munich, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Mar. 26, 1974, Ser. No. 454,851

Claims priority, application Germany, Mar. 29, 1973, 2315751

Int. Cl.[2] H04J 3/00

U.S. Cl. 179—15 AQ **1 Claim**



1. A PCM time-division multiplex telecommunication network having a plurality of PCM time-division multiplex switching centers interconnected over four-wire time-division multiplex connections, each of said PCM time-division multiplex switching centers having stores assigned individually to each pair of conductors of the four-wire time-division multiplex connections for storing all elements of information associated with message time slots during a pulse frame and arriving on or to be transferred over the time-division multiplex connection concerned, said pulse frame being determined by the duration of the sampling period of the time-division multiplex system, said network further having crosspoint elements for the space-division switching of the message time slots as well as address memories which are used to accomplish the space- and time-division coordination of the operation of the crosspoint elements and of the store allocations of the stores assigned to the individual message time slots, said PCM time-division multiplex telecommunication network being provided with a number of switching time slots larger than the number of said message time slots available on the four-wire time-division multiplex connections, characterized in that in the time-division multiplex switching centers means are provided for supplying the operating pulses required for a four-wire time-division multiplex connection in the course of a switching operation for the writing of elements of information or communication-channel addresses into the stores or address memories (VHS,KHS) and for the readout thereof, comprising a single clock generator whose clock frequency corresponds to the number of bit times for elements of information which lie within a sampling period, a bit counter (BZ) having designated counter positions for counting the bit times appearing during one of said switching time slots, and a time slot counter for uniquely representing by count the number of said switching time slots, said time slot counter being normally stepped by a series of pulses collected at a counter stage of said bit counter the repetition rate of said pulses equalling the rate of appearance of elements of information on the four-wire time-division multiplex connections stepped during each run of the bit counter during each of said pulse frames for the duration of one bit time, the counter being moved backward one counter position during another of said bit times as uniquely determined by one of said counter positions of said bit counter, the output signals of said bit counter specifying switching time slot addresses which are routed continually to the address memories and there being provided in each switching center for each four-wire time-division multiplex connection a controlled OR circuit over which the switching time slot addresses specified by the time slot counter or the message time slot addresses output by the address memories allocated to the stores during the individual switching time slots, or the message time slot addresses produced by a line counter according to the rate of appearance of elements of information, are applied as access addresses for the stores as a function of designated counter positions of the bit counter.

3,970,795

MEASUREMENT OF NOISE IN A COMMUNICATION CHANNEL

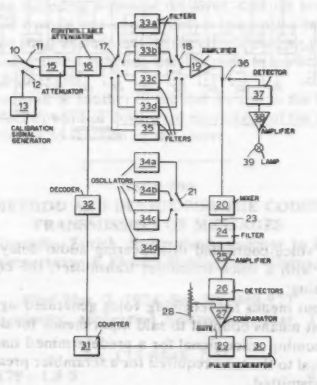
Edgar Robert Allen, Stanmore, England, assignor to The Post Office, London, England

Filed July 16, 1974, Ser. No. 488,993

The portion of the term of this patent subsequent to June 17, 1992, has been disclaimed.

Int. Cl.[2] H04J 1/16

U.S. Cl. 179—15 BF **4 Claims**



1. In a FDM communications link having a plurality of channels, and wherein a multiplicity of said plurality of channels is carrying traffic and at least one channel, called a quiet

channel, carries no traffic; apparatus for assessing the noise performance of said FDM communications link, comprising:

a. Tee-in means for tapping off a portion of a broad band signal transmitted over said communications link;

b. filter means connected to said tee-in means for isolating a predetermined bandwidth lying within said quiet channel;

c. power measuring means including signal mixing means and detector means operable to produce a DC output representative of the power level in said predetermined bandwidth of a noise signal;

d. display means;

e. comparator means having said DC output applied to a first input, a reference level applied to a second input and an output connected to operate said display means; and

f. said power measuring means further including a controllable attenuator connected between said tee-in means and said filter means, an output from said display means connected to control said controllable attenuator so that said comparator means has zero output.

3,970,796

TIME-DIVISION-MULTIPLEX ARRANGEMENT

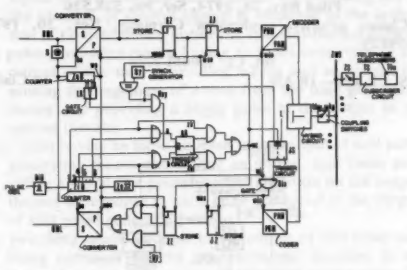
Karoly Gyürki, Bolligen, Switzerland, assignor to Siemens-Albis AG, Zurich, Switzerland

Filed Oct. 7, 1974, Ser. No. 512,453

Claims priority, application Switzerland, Oct. 10, 1973, 14399/73

Int. Cl.² H04J *3/06*

U.S. Cl. 179—15 AF **9 Claims**



1. A time-division-multiplex arrangement for compensating changes in the mutual phase position of the timing pulse frames of a PCM-time-division-multiplex transmission line, comprising means defining a transmitting end and a receiving end for the time-division-multiplex arrangement, a series/parallel converter provided at said receiving end, a first one-word intermediate store arranged in circuit with said series/parallel converter, said one-word intermediate store having an input side and an output side, means for operating the input side of said first one-word intermediate store in an external word pulse train corresponding to a received bit pulse train, means for operating the output side of said first one-word intermediate store in one of two uniformly mutually offset intermediate word pulse trains, a second one-word intermediate store having an output side connected in circuit with the first one-word intermediate store, means for operating the second one-word intermediate store at its output side in an internal word pulse train, a parallel/series converter connected in circuit at the transmitting end, a first one-word intermediate store having an input side and an output side in circuit with the parallel/series converter, means for operating said output side of the first one-word-intermediate store at an external word pulse train at the transmitter end, means for controlling said input side of said first one-word intermediate store at the transmitter end in one of two uniformly mutually shifted intermediate word pulse trains, a second one-word intermediate store arranged in circuit with said first one-word intermediate store at the transmitter end, means which in the presence of phase differences which vary by a predetermined amount from a given limit between the pulse frames of the external word pulse train and pulse frames of the momentarily active intermediate word pulse train initiate a change to the other intermediate word pulse train, means for controlling the one-word intermediate store both at the receiver end and at the transmitter end with the same intermediate word pulse train of both uniformly mutually shifted intermediate word pulse trains with the period of the internal word pulse train of the time-division-multiplex apparatus, and means for directly connecting at the receiver end the output of the second one-word intermediate store and at the transmitter end the input of the second one-word intermediate store with the time-division-multiplex arrangement for transmitting in parallel form the arriving PCM-words in the internal word pulse train.

3,970,797

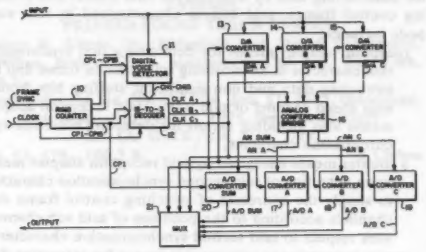
DIGITAL CONFERENCE BRIDGE

David A. Johnson, Easton, and William C. Towle, Sudbury, both of Mass., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Filed Jan. 13, 1975, Ser. No. 540,717

Int. Cl.² H04M *3/56, 1/58*

U.S. Cl. 179—15 AT **8 Claims**



1. Digital conference bridge apparatus comprising

a plurality of M input channels for transmitting digital signals;

a plurality of M output channels, each output channel corresponding to a different one of said input channels;

detection means coupled to said input channels for detecting the presence of digital signal information thereon;

a group of N digital-to-analog converting means for converting digital signals to analog signals;

decoder means coupled to said detection means and to said digital-to-analog converting means, said decoder means being operable individually to couple said digital-to-analog converting means to up to N input channels having digital signal information present thereon;

analog bridge means having N input connections and N+1 output connections, each of N of the output connections corresponding to an input connection and the other output connection being a summing output connection;

each of said digital-to-analog converting means being coupled to a different one of the N input connections of said analog bridge means;

said analog bridge means being operable to produce at each of the N output connections the analog signals present at all but the corresponding one of said N input connections, and being operable to produce at the summing output connection an analog signal which is the sum of the analog signals present at said input connections;

a group of N+1 analog-to-digital converting means for converting analog signals to digital signals, each of said analog-to-digital converting means being coupled to a different one of the N+1 output connections of said analog bridge means; and

output multiplexing means coupled to said analog-to-digital converting means, to said decoder means, and to said plurality of output channels for applying digital signals from particular analog-to-digital converting means to particular output channels.

3,970,798
TIME DIVISION MULTIPLEX DATA TRANSMISSION SYSTEM

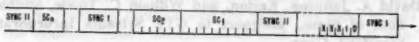
Gabriel Epenoy, Vence, and Remi Vautier, Nice, both of France, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 21, 1975, Ser. No. 569,718

Claims priority, application France, Apr. 26, 1974, 74.15155

Int. Cl.² H04J 3/06

U.S. Cl. 179—15 AF **4 Claims**



1. A data transmission system including a number of switching nodes and data transmission lines connecting said nodes, for transmitting data by interspersed data frames and switching control frames, said system characterized in that each node includes:

reception adapter means for detecting a first synchronization character in an incoming transmission frame and for extracting data and non-significant stuffing bits from a high speed channel of said frame, said reception adapter means also including means for detecting a second synchronization character,

a counter means energized by said reception adapter means upon detection of said second synchronization character, to supply the addresses of switching control frame subchannels according to the positions of said sub-channels with respect to said second synchronization character;

means responsive to said counter means for extracting data from selected switching control frame sub-channels;

a transmission adapter means for regenerating said first synchronization character of said data frame and for thereafter transmitting both data received on selected sub-channels and data originating at each node, said transmission adapter means including a means for inserting non-significant stuffing bits into said high speed channel of frames transmitted after said first synchronization character over said transmission line.

3,970,799
COMMON CONTROL SIGNALING EXTRACTION CIRCUIT

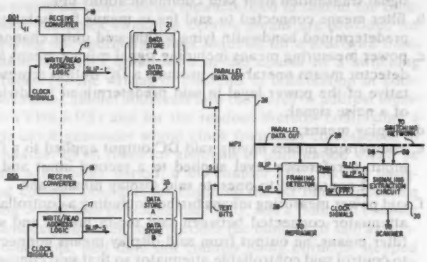
John Robert Colton, Freehold; Robert Bruce Heick, Eatontown, and Henry Mann, Holmdel, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Oct. 6, 1975, Ser. No. 619,813

Int. Cl.² H04J 3/12

U.S. Cl. 179—15 BY **11 Claims**

11. In a time division multiplex system wherein a plurality of digital groups of time division multiplexed channels are time multiplexed together on to a transmission link, each digital group including a similar predetermined framing bit pattern, each digital group using *n*-bits for transmitting digital information for each channel with the *n*th bit borrowed for signaling purposes in every *m*th frame, each digital group also including signaling framing bits in a given bit position of every *f* frames for the purpose of identifying the signaling bits of the group; a signaling extraction circuit characterized by signaling framing pattern store means for maintaining a continuing real time record of the pattern of the signaling framing bits for each digital group, a signal bit storage means for storing the *n*th signaling bit of each channel of each digital group, and means for enabling the signal bit storage means to receive the



*n*th signaling bit of each channel of a digital group after a predetermined signaling framing bit pattern has been recorded for the group.

3,970,800
SWITCHING ARRANGEMENT FOR ASCERTAINING OVERLAP PRIOR TO TRANSFER OF CODE DIGITS IN A TELEPHONE EXCHANGE

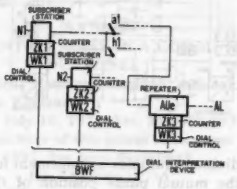
Werner Braunbeck, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Nov. 29, 1974, Ser. No. 528,556

Claims priority, application Germany, Nov. 30, 1973, 2359829

Int. Cl.² H04M 1/26

U.S. Cl. 179—18 AD **4 Claims**



1. In a telephone exchange switching system having subscriber stations and/or local repeaters connected thereto, apparatus for ascertaining an overlap prior to transfer of code digits being interpreted to a dial interpretation device in said exchange, comprising:

a plurality of dial control means and counting means for receiving and storing dial code digits, each subscriber station and local repeater in said system having a said dial control means and counting means assigned thereto.

means for producing clock pulses,

switching means in each said dial control means for controlling, upon expiration of a time period determined by a said clock pulse, the triggering of the transfer of a code digit from said counting means and as a result of a signal identifying the end of a digit,

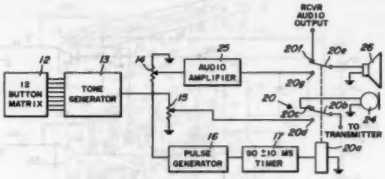
means in each said dial control means for generating and transmitting a test signal, upon operation of the said switching means associated therewith, responsive to said clock pulses, said test signal being coupled to switching means in others of said dial control means and

means for blocking transfer of code digits to said dial interpretation device responsive to operating states in said switching means of said other dial control means as determined by said test signals.

3,970,801
DIALING APPARATUS FOR A PORTABLE RADIO TELEPHONE

Danny E. Ross, Plantation, and James M. Mueller, Margate, both of Fla., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 3, 1974, Ser. No. 529,020
Int. Cl.² H04M 1/50
U.S. Cl. 179—41 A 5 Claims



1. In a portable radio including a transmitter/receiver with a microphone and audio transducer, the improved pushbutton telephone dialing apparatus comprising:

a. tone generating means having a plurality of control inputs and an output, said tone generating means providing a predetermined one of a plurality of tones in response to each of a plurality of control signals on the plurality of control inputs;

b a multibutton device coupled to the plurality of control inputs of said tone generating means for providing any of the plurality of control signals in response to the activation of predetermined buttons of said multibutton device;

c pulse generating means having an input connected to the output of the tone generating means and an output for sensing the beginning of a tone from the tone generating means and providing a single pulse at the output in response thereto;

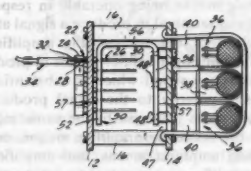
d a timer having an input coupled to the output of said pulse generating means and having an output, said timer providing a signal of a predetermined duration on the output thereof in response to each pulse produced at the output of said pulse generating means;

e. switching means coupled to the output of said timer and being activated for the predetermined duration in response to a signal thereon, said switching means normally coupling the microphone to the transmitter and the audio transducer to the receiver and said switching means, upon activation thereof, disconnecting the microphone and coupling the audio transducer and the transmitter to the output of said tone generating means.

3,970,802
FLEXIBLE CIRCUIT CONNECTING ARRANGEMENT FOR INTERCONNECTION MODULES

John Peter Nijman, West Hill, Canada, assignor to Bunker Ramo Corporation, Oak Brook, Ill.

Filed Oct. 16, 1974, Ser. No. 515,274
Int. Cl.² H04Q 1/06, 1/14; H01R 11/00
U.S. Cl. 179—98 14 Claims



1. An electrical interconnection module, comprising:

a front panel and a back panel spaced from and secured to said front panel and forming a space between said panels;

plurality of first electrical/contacts extending through and supported in aligned rows by said front panel with forward portions for engagement with external mating contacts and rear portions disposed in said space;

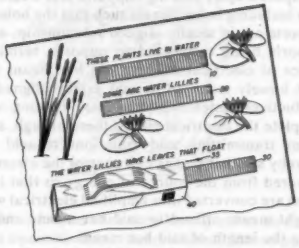
a plurality of second electrical contacts extending through and supported by said back panel with forwardly extending portions disposed in said space and rearwardly extending portions for engagement with external mating contacts, said second electrical contacts supported in groups; and

flexible printed circuit means disposed between said front and back panels and being formed with a surface extending between said panels for receiving said rear portions of said first contacts and said forwardly extending portions of said seond contacts, and printed circuit means comprising at least one layer of insulating material and at least one pair of printed circuits on respective sides of said layer and extending between said first contacts of at least two of said rows and said second contacts of at least two of said groups, each of said printed circuits individually connecting said first electrical contacts of a row with said second contacts of a respective group of second contacts.

3,970,803
PRINTED SOUND TRACK SYSTEM

George R. Kinzie, Jr., Ridgefield, and Daniel Gravereaux, Wilton, both of Conn., assignors to CBS Inc., New York, N.Y.

Continuation of Ser. No. 322,774, Jan. 11, 1973, abandoned. This application Feb. 14, 1975, Ser. No. 550,065
Int. Cl.² G11B 7/08, 7/18, 7/24
U.S. Cl. 179—100.3 B 6 Claims



1. A system for generating audible information from indicia printed on a paper comprising:

a sound track oriented on said paper in a manual scanning direction, said track consisting of a multiplicity of elongated parallel sound track segments of the variable area-type printed on said paper in closely spaced arrangement, the segments being oriented in a direction which is generally transverse the manual scanning direction, said segments being arranged in an order which represents sequential portions of the complete sound information contained in said track, adjacent segments having a substantial degree of waveform redundancy;

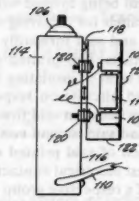
an optical scanner adapted to be manually scanned over said track in the manual scanning direction, the scanner including automatic means for continuously scanning the segments longitudinally to produce electrical signals representative of audio information; and

means for converting said electrical signals into audible sounds.

3,970,804
ELECTRO-MECHANICAL AMPLIFIER SOUND TRANSDUCER

Jerry O'Brien, deceased, late of Jersey City, N.J., and Catherine H. O'Brien, executrix, 33 Pamrapo Ave., Jersey City, N.J. 07305

Filed Mar. 25, 1974, Ser. No. 454,224
Int. Cl.[2] H04L 15/04; H04R 21/00, 21/02
U.S. Cl. 179—131 18 Claims



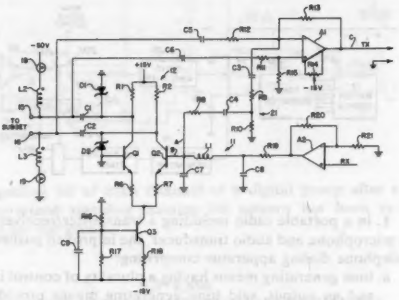
1. An electromechanical amplifying sound transducer comprising:
   a. diaphragm means for receiving acoustic waves and vibrating in response thereto;
   b. conductive support means mounted onto said diaphragm and adapted to be connected to a source of electrical energy;
   c. weighted conductive bar means loosely coupled to said support means, said support means comprising at least two spaced apart bearing supports said bearing supports each including holes therein such that the holes of the two supports are in axially aligned relationship, each of said supports being connected to opposite terminals of the source of electrical energy, said bar means including a shaft loosely mounted in said axially aligned holes and conductively interconnecting said bearing supports to complete the electrical circuit therethrough, said support means transmitting said vibrations to said bar means whereby said bar means can control the electrical energy delivered from the source of energy so that the acoustic waves are converted into amplified electrical waves, and
   d. weight means affixed to said bar means and adjustable along the length of said bar means.

9. An electromechanical amplifying device for transmission of binary information and audible sound, comprising:
   a. base means vibrating in response to acoustic waves;
   b. at least a pair of spaced apart conductive support means mounted onto said base means and adapted to be connected to a source of electrical energy;
   c. weighted conductive bar means loosely contacting said support means and interconnecting them, said support means transmitting said vibrations to said bar means; and
   d. manually operated mechanical interrupt means unconnected to the electrical circuit, arranged on said base means for mechanically contacting with said bar means for intermittently disconnecting said bar means from said support means when said interrupt means are mechanically actuated, whereby said bar means can control the electrical energy delivered from the source of electrical energy so that the audible sounds and the intermittent disconnections are converted into amplified electrical waves, such that the identical electrical circuit can be utilized for both the transmission of binary information and audible sound.

3,970,805
ACTIVE HYBRID CIRCUIT

Robert M. Thomas, Maitland, Canada, assignor to GTE Automatic Electric (Canada) Limited, Brockville, Canada

Filed Feb. 22, 1974, Ser. No. 444,889
Int. Cl.[2] H04B 1/58
U.S. Cl. 179—170 NC 5 Claims

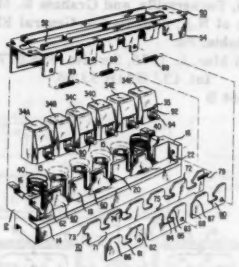


1. An active hybrid circuit comprising
   an input terminal for receiving input signals;
   receiving amplifier means having an input connection coupled to said input terminal and having two output connections for producing therebetween a differential output of the signals applied at the input connection;
   two common terminals for connecting a transmitting and receiving unit thereto;
   said output connections of the receiving amplifier means being coupled to said common terminals, whereby input signals received at the input terminal and amplified to produce a differential output by the receiving amplifier means are applied to the transmitting and receiving unit;
   transmitting amplifier means having two input connections for receiving a differential input and having an output connection;
   said input connections of the transmitting amplifier means being coupled to said common terminals, whereby signals being transmitted by the transmitting and receiving unit are applied to the transmitting amplifier means and amplified transmitted signals are produced at the output connection of the transmitting amplifier means; and
   compensating means coupled to the input terminal and directly to a first of said two input connections of the transmitting amplifier means;
   said compensating means including
      first circuit means including impedance means connected between said input terminal and a connection point,
      second circuit means including impedance means connected between said connection point and said first input connection of the transmitting amplifier means, and
      third circuit means including impedance means connected between said connection point and a point of reference potential;
   said compensating means being operable in response to a signal at the input terminal to produce a signal at said first input connection of the transmitting amplifier means causing the transmitting amplifier means to produce at its output connection a signal which is substantially equal and of opposite polarity to the signal produced at its output connection in response to the same input signal amplified by the receiving amplifier means, coupled to the transmitting amplifier means, and amplified by the transmitting amplifier means, whereby substantially none of a signal received at the input terminal appears at the output connection of the transmitting amplifier means.

3,970,806
MULTIPLE SWITCH

Jack Edward Distler, Indianapolis, Ind., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed June 9, 1975, Ser. No. 585,061
Int. Cl.² G05G 9/00; H01H 9/20
U.S. Cl. 200—5 R 12 Claims

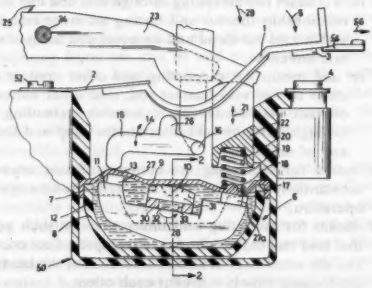


1. A multiple switch comprising a multiplicity of switch actuators each of which is movable between a first and a second position, the switch actuators being associated in a multiple of pairs, each pair consisting of a first and a second switch actuator, and means for providing interaction between the switch actuators responsive to the movement of the switch actuators, the interaction means permitting all of the first switch actuators that are in the second position to move to the first position responsive to the movement of the second switch actuator of any pair to the second position, the interaction means retaining in the second position all other second switch actuators in the second position.

3,970,807
ELECTRIC SWITCH HAVING A TIME-DELAY MECHANISM

Alois Schaffeler, Spaichingen, and Wolfgang Moller, Schwenningen, both of Germany, assignors to J. & J. Marquardt, Germany

Filed Mar. 17, 1975, Ser. No. 558,652
Claims priority, application Germany, Mar. 22, 1974, 2413786
Int. Cl.² H01H 7/03, 43/00
U.S. Cl. 200—34 7 Claims

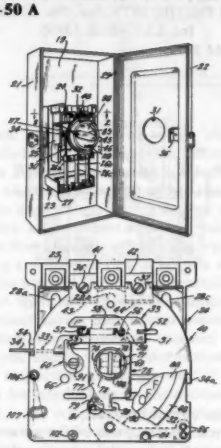


1. An electric switch, comprising a housing, a fixed contact on said housing, a contact arm adjacent said fixed contact having a free end with a movable contact and an opposite end mounted on said housing, said free end of said arm with said movable contact being biased in a direction toward said fixed contact for engagement of said movable contact with said fixed contact, a lever pivotally mounted on said housing below said contact arm and being displaced by contact of said arm and movement of said arm toward said fixed contact, a liquid choke medium reservoir in said housing below said lever, second plate means defining at least one choke medium passage in said reservoir, first plate means pivotally mounted in said housing below said lever and having a first end portion operatively associated with said lever so as to be pivotally displaceable by movement of said lever and having a second end portion on the opposite side of said pivot movable in an opposite direction and also having a movement delay part in the choke medium passage acting on the medium so as to delay the movement of said first plate means and hence the closing movement of said contact arm.

3,970,808
CIRCUIT INTERRUPTER HAVING ROTARY SWITCH OPERATOR AND INTERLOCKING STRUCTURE WITH TWO POSITION MOUNTING PLATE

Carl E. Gryctko, Haddon Heights, N.J.; Kenneth D. Ball, Warminster, and Peter J. McGinnis, Chester Township, both of Pa., assignors to I-T-E Imperial Corporation, Spring House, Pa.

Filed Oct. 15, 1974, Ser. No. 514,591
Int. Cl.² H01H 9/22, 3/20, 33/48
U.S. Cl. 200—50 A 11 Claims



1. In combination, an enclosure having a first side normally closed by an openable front cover; a circuit interrupter within said enclosure and having a handle disposed entirely within said enclosure; an operator mechanism separate from said cover for manually operating said circuit interrupter from a point outside of said enclosure and in front of said cover; said mechanism including a single mounting plate fixedly mounted to said interrupter, a crank means positioned at the rear of said plate and operatively connected to said handle, an operating handle disposed in front of said plate in operative position received by an aperture in said cover as the latter moves from its open to its closed position, a main shaft connecting said operating handle to said crank means whereby pivotal movement of said operating handle in a plane parallel to said cover in its said closed position is effective to operate said crank means which in turn operates said handle, a first element biased to cover latching position for maintaining said cover closed, a second element biased to blocking position, cam means operable by said operating handle to move said first element to cover releasing position, said cam means and said second element in said blocking position cooperating to prevent operation of said operating handle to close said circuit interrupter when said front cover is open, interlock means

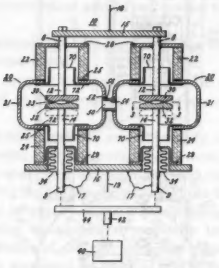
operable by said cover upon closing thereof to move said second element from said blocking position to a retracted position wherein said operating handle may be operated to close said circuit interrupter, defeater means for moving said first element to said cover releasing position when said circuit interrupter is closed, an indicia carrying plate behind said operating handle and cooperating therewith to indicate the position of said handle; said mounting plate including a first set of formations operatively positioning said first element, said second element, said interlock means and said defeater means on said mounting plate in combination for use of said mechanism with said cover hinged along a first edge of said enclosure; said mounting plate also including a second set of formations defining alternate operative positions on said mounting plate for said first element and said defeater means; with said first element and said defeater means in said alternate positions said mechanism being usable with a cover hinged along a second edge of said enclosure opposite to said first edge.

3,970,809

ELECTRIC CIRCUIT BREAKER COMPRISING PARALLEL-CONNECTED VACUUM INTERRUPTERS

Graham R. Mitchell, Willingboro, N.J., assignor to General Electric Company, Philadelphia, Pa.

Filed Feb. 10, 1975, Ser. No. 548,847
Int. Cl.² H01H 33/66
U.S. Cl. 200—144 B **10 Claims**



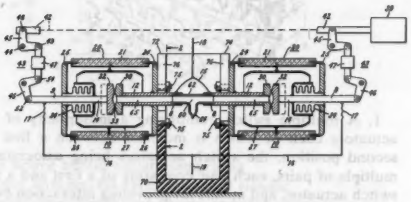
1. In an electric circuit breaker,
a. a pair of circuit interrupters of the vacuum-type electrically connected in parallel circuit relation with each other,
b. each interrupter comprising:
i. a pair of separable contacts, one of which is movable from a closed position of engagement with the other contact to an open position spaced from the other contact, thus providing a gap between said contacts across which arcs are established during circuit-interrupting operations,
ii. an evacuated envelope within which said contacts are located, said envelope having a tubular metal wall portion surrounding said inter-contact gap,
iii. an opening within said tubular metal wall portion,
c. means for separating the contacts of said interrupters substantially simultaneously during a circuit-interrupting operation,
d. said interrupters being located with said tubular wall portions in closely adjacent side-by-side relationship,
e. and means providing a passage between said openings in said metal wall portions for conveying arcing products from any of said inter-contact gaps that is arcing during circuit-interruption to any of said inter-contact gaps that is not then arcing, thereby promoting concurrent arcing at said gaps during a high-current circuit interrupting operation,
f. and means providing a seal between said openings for maintaining said passage sealed from the space surrounding said envelopes.

3,970,810

ELECTRIC CIRCUIT BREAKER COMPRISING PARALLEL-CONNECTED VACUUM INTERRUPTERS

James J. Carroll, Turnersville, and Graham R. Mitchell, Willingboro, both of N.J., assignors to General Electric Company, Philadelphia, Pa.

Filed Mar. 6, 1975, Ser. No. 556,077
Int. Cl.² H01H 33/66
U.S. Cl. 200—144 B **10 Claims**



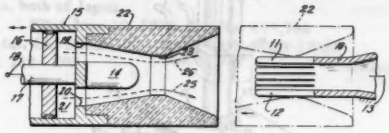
1. In an electric circuit breaker,
a. a pair of circuit interrupters of the vacuum-type electrically connected in parallel circuit relation with each other,
b. each interrupter comprising:
i. a pair of separable contacts, one of which is movable from a closed position of engagement with the other contact to an open position spaced from the other contact, thus providing an inter-contact gap between said contacts across which arcs are established during circuit-interrupting operations,
ii. an evacuated envelope within which said contacts are located, said envelope comprising a casing at least partially of insulating material and an end cap at one end of said casing sealed to said casing,
iii. a contact rod extending through said end cap in sealed relationship thereto and having an inner end located within said envelope and an outer end located outside said envelope,
iv. and means for supporting said other contact on the inner end of said contact rod, said other contact and contact rod containing a conduit extending therethrough between said inter-contact gap and the outer end of said rod,
c. means for separating the contacts of said interrupters substantially simultaneously during a circuit-interrupting operation,
d. means for mounting said interrupters in such positions that said end caps of the two interrupters face each other and the outer ends of said contact rods of the interrupters are located closely adjacent each other,
e. and connecting means located between the outer ends of said contact rods and providing a communicating passage between the conduits in said contact rods for conveying arcing products from any of said inter-contact gaps that is then arcing to any of said inter-contact gaps that is not then arcing, thereby promoting concurrent arcing at said gaps during high-current circuit interruption.

3,970,811

NOZZLE AND CONTACT ARRANGEMENT FOR PUFFER TYPE INTERRUPTER

Peter Krebs, Harleysville, Pa., assignor to I-T-E Imperial Corporation, Spring House, Pa.

Filed Sept. 16, 1974, Ser. No. 506,426
Int. Cl.² H01H 33/88
U.S. Cl. 200—148 A 10 Claims



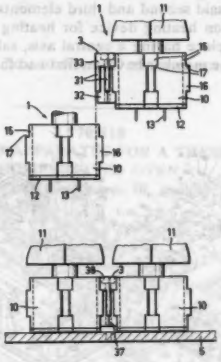
1. A puffer interrupter comprising, in combination:
a stationary contact comprising an elongated tube;
a movable contact comprising a plurality of flexible contact fingers disposed in the form of an inwardly tapering truncated cone, a first end of each said fingers arranged to form an opening at the narrower end of said movable contact to axially telescope over the end of said stationary contact elongated tube to make contact with the outer surface of said tube;
a piston means and a cylinder means relatively movable with respect to one another to produce gas movement, one of said piston and cylinder means being connected to and movable with said movable contact;
a movable operating rod connected to said movable contact for moving said movable contact relative to said stationary contact and for producing movement of gas by said piston means and said cylinder means;
an insulation nozzle secured to and movable with said movable contact for guiding the flow of gas therethrough during the opening of said movable and stationary contacts, said insulation nozzle surrounding said movable contact and having an interior orifice restriction having a diameter just larger than the outer diameter of said stationary contact elongated tube;
said movable contact being positioned within said nozzle and disposed on one side of said orifice restriction and along the interior surface of said nozzle with said fingers tapering from one end of said nozzle to said orifice restriction; said nozzle being axially movable with said movable contact to an engaged position such that said stationary contact tube moves into said nozzle, through said orifice restriction, and into engagement with said movable contact;
said piston means and said cylinder means being disposed adjacent said movable contact and forcing gas flow substantially completely through the entire volume defined by said conically disposed contact fingers and along the interior surfaces of each of said fingers and into and through said orifice restriction when said movable contact is moved away from said stationary contact said one side of said orifice restriction within which said movable contact is disposed being the side which is downstream of the movement of gas through said orifice restriction; the other side of the interior of said nozzle being upstream of said gas flow and comprising an insulation surface and allowing the creation of an upstream arc during interruption operation.

3,970,812

PLURAL, STACKED SIDE BY SIDE SWITCH HOUSING ARRAY HAVING DISCRETE HOUSING COUPLING ELEMENTS

Klaus Nowack, Baden, Switzerland, assignor to Contraves AG, Zurich, Switzerland

Filed Nov. 11, 1974, Ser. No. 522,746
Claims priority, application Switzerland, June 21, 1974, 8505/74
Int. Cl.² H01H 9/02, 13/02; A63H 33/10
U.S. Cl. 200—307 6 Claims



1. A mosaic arrangement of switch elements, especially electrical push-button switches with substantially quadratic switch bodies arranged at intersection locations at the front surface of an electrical switch panel and the like, the improvement wherein each of the switch bodies are provided with recesses at their edge corners extending substantially perpendicular to the front surface of the switch panel, each of said recesses being constructed over a portion of the edge corner length as guide grooves, and at least partially at the intersection locations there are provided coupling elements, each coupling element having four corner noses, said four corner noses extending into respective recesses of switch bodies neighboring one another at an intersection location and engaging with respective guide grooves of said neighboring switch bodies for interlocking to one another said neighboring switch bodies, each coupling element being provided with an axial throughpassage bore for receiving an associated attachment means for securing the switch bodies which are interlocked by such coupling element to the electrical switch panel.

3,970,813

APPARATUS FOR INDUCTIVELY HEATING THE END OF AN ELONGATED WORKPIECE

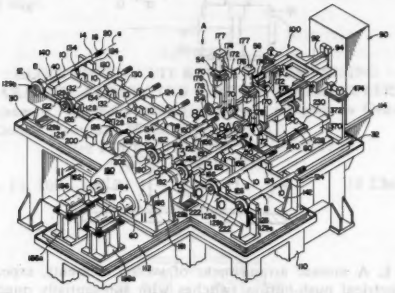
Paul L. Day, Parma, Ohio, assignor to Park-Ohio Industries, Inc., Cleveland, Ohio

Filed Jan. 9, 1975, Ser. No. 539,919
Int. Cl.² H05B 5/00; C21D 1/06, 1/66
U.S. Cl. 219—10.57 9 Claims

1. An apparatus for inductively heating the axial generally cylindrical end of an elongated workpiece having a central axis, said end terminating in a generally flat surface generally perpendicular to said axis, said apparatus comprising: means for mounting said workpiece for rotation about the axis of a workpiece being heated; means for rotating the workpiece being heated about said axis; a generally circular inductor for matching said end; means for mounting said inductor generally concentric with said axis; means for moving said inductor in a direction parallel to said axis from a remote position to a position contacting said surface of a workpiece being heated; means for retracting said inductor along said axis and away

from said surface a preselected air gap distance; means for energizing said inductor when said inductor is in the retracted position and while said workpiece is rotating, said energizing means including two output leads of a power supply and means for connecting said output leads to said inductor; said connecting means comprising a first element movable with said inductor and having first and second electrically insulated portions; a second element electrically connected to one of said output leads and adapted to engage said first portion; a third element electrically connected to the other of said output leads and adapted to engage said second portion; and means for allowing relative movement of said first element with respect to said second and third elements.

8. An induction heating device for heating the end of an elongated workpiece having a central axis, said device comprising: a rod-like member having a first end facing the end of



a workpiece to be heated and a second end, said rod-like member being adapted for reciprocation in a direction corresponding to the axis of a workpiece to be heated; a carrier affixed to said first end of said rod-like member; a generally circular inductor for matching said end of said workpiece to be heated; means for securing said inductor onto said carrier in a plane generally perpendicular to the central axis of a workpiece mounted for heating; said inductor having first and second input leads; rigid first and second conductor bars electrically connected to said leads and extending generally parallel to and offset outwardly from said rod-like element; first support means adjacent said carrier for supporting said conductor bars; second support means adjacent said second end of said rod-like member for supporting said conductor bars; and means for connecting said conductor bars to a power supply.

3,970,814

METHOD FOR REPAIRING INGOT MOLDS AND APPARATUS THEREFOR

Arne Georg Arnesen, Vagsbygd, Norway, and Jan Schokkenbroek, Alkmaar, Netherlands, assignors to Elkem-Spigerverket A/S, Oslo, Norway

Filed Sept. 10, 1974, Ser. No. 504,823

Claims priority, application Norway, Sept. 13, 1973, 3578/73

Int. Cl.² B23K 9/04

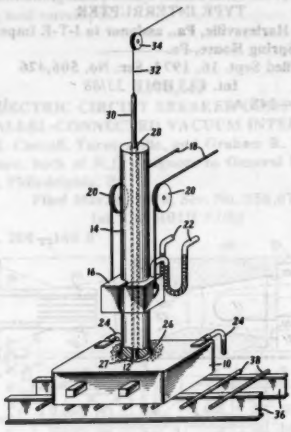
U.S. Cl. 219—76 **8 Claims**

3. Apparatus for repair of cavities in cast iron parts comprising:

a. a substantially non-consumable electrode having a longitudinal extent and having a hollow core along its longitudinal extent;

b. means for bringing the cast iron part into proximity with said electrode in the area of the cavity to be repaired;

c. means for supplying an electrical charge to the electrode in sufficient amount to cause the cavity area of the cast iron part to become molten; and



d. means for supplying repair material comprising cast iron to the cavity of the cast iron part through the hollow core of the non-consumable electrode.

3,970,815

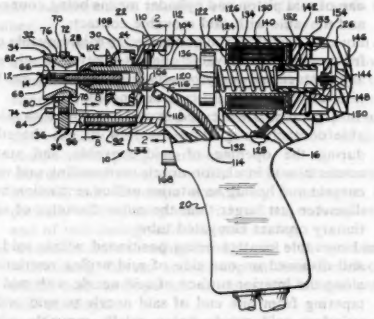
STUD WELDING TOOL

Howard N. Wieland, Jr., Amherst, and Lawrence A. Krischer, Elyria, both of Ohio, assignors to TRW Inc., Cleveland, Ohio

Filed Nov. 6, 1974, Ser. No. 521,183

Int. Cl.² B23K 11/04

U.S. Cl. 219—98 **21 Claims**



13. In a tool for welding a stud to a workpiece, a tool body, a chuck, means for supporting said chuck in a position extending forwardly of the tool body, a spark shield, a welding foot supported by said body and holding the spark shield loosely to enable said spark shield to float relative to said foot and said chuck, and positioning means rigidly extending forwardly of said welding foot to engage the workpiece and position said welding foot at a fixed distance from the workpiece, whereby said spark shield will be positioned with a forward end thereof against a workpiece when the tool is in a welding position with said positioning means engaging the workpiece.

16. In a tool for welding a stud to a workpiece, a tool body, a chuck leg in said tool body and supported for longitudinal movement with respect thereto, a coil spring located around a rear portion of said chuck leg, said chuck leg having seating means against which one end of said coil spring is engaged, second seating means located around said chuck leg against which the other end of said coil spring is engaged, said second

seating means comprising a sleeve having outer threads and having a central opening exceeding the size of the rear portion of said chuck leg and held in a nonrotatable position relative to said chuck leg, and adjustable means for moving said second seating means toward and away from said first seating means when the chuck leg is stationary, said adjustable means comprising threaded means engagable with the threads of said sleeve.

3,970,816

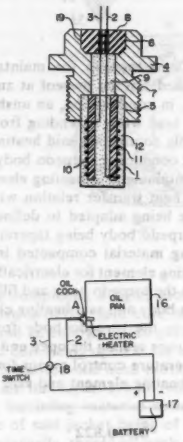
ELECTRIC HEATER FOR HEATING LUBRICATING OILS

Hisashi Hosokawa, 2-7, 4-chome, Nishi-ochiai, Shinjuku, Tokyo, and Eicho Iijima, 9-6, 7-chome, Shakujii-cho, Nerima, Tokyo, both of Japan

Filed June 10, 1974, Ser. No. 477,704

Int. Cl.² H05B *3/02*; **F01M** *5/02*; **F02N** *17/04*

U.S. Cl. 219—205 **9 Claims**



1. An oil heater for heating lubricating oils having infrared energy absorption peaks within infrared wavelengths ranging from 2.5 μ to at least 15 μ comprising:

a. an oil cock having a top section and a bottom section, said bottom section being adapted to sealingly engage an opening in the wall of an oil reservoir; and

b. an electrical infrared heating element coupled to said oil cock and adapted to contact said oil contained within said oil reservoir when said cock engages said opening in the wall of said reservoir, said heating element having an infrared emission spectrum at 400°C ranging from 2.5μ to at least 15μ to match the infrared absorption spectrum of the oil contained in the reservoir and in which the relative strength of the radiation emitted between the wavelengths 5μ–15μ averages at least approximately 50% of the relative strength of the radiation emitted between 2.5μ and 4μ.

3,970,817

HAZARDOUS LEAKAGE CURRENT PREVENTING FOR REFRACTORY-ENCASED HEATER ELEMENTS

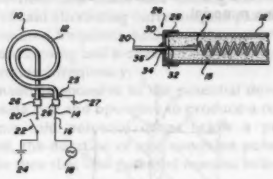
Robert Lee Boyd, 103 Ross Drive, Vienna, Va. 22180

Filed May 14, 1975, Ser. No. 577,214

Int. Cl.² H05B *1/00*

U.S. Cl. 219—209 **15 Claims**

1. A leakage current protective device for refractory-encased electric heating elements comprising a controlled resistance extending between a resistance heating element and a ground connection adjacent the refractory encasing said element, thereby to provide low current flow therethrough



with resultant low heat to drive off moisture attracted to said refractory.

3,970,818

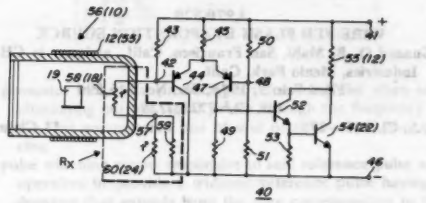
METHOD AND APPARATUS FOR A THERMISTOR COMPENSATED OVEN

Jerome Peter Friedrichs, Des Plaines, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Oct. 17, 1974, Ser. No. 515,798

Int. Cl.² H05B *1/00*

U.S. Cl. 219—210 **12 Claims**



1. A method for maintaining a constant temperature at a desired point within an oven as the ambient temperature changes, including the steps of;

providing an oven having such desired point at one location therein,

sensing the temperature at a second location inside of said oven;

producing a control signal with an apparatus, the magnitude of said control signal varying inversely with respect to the magnitude of said temperature at said second location,

providing continuous heat to said oven proportionally to the magnitude of said control signal,

sensing ambient temperature at a third location exterior to said oven with a sensor at said third location, and

varying continuously the magnitude of said control signal in a predetermined relationship to said sensed ambient temperature by electrically coupling said sensor to said apparatus.

3,970,819

BACKSIDE LASER DICING SYSTEM

Gerald Alan Gates, and William John Ryan, both of Jericho, Vt., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 25, 1974, Ser. No. 526,988

Int. Cl.² B23K *26/00*

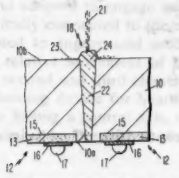
U.S. Cl. 219—121 LM **8 Claims**

1. A process for breaking along predetermined lines a wafer of single crystal material having a given thickness and selected breaking strength comprising the steps of,

applying a laser beam along said lines, said laser beam having an intensity sufficient to convert all the thickness of the wafer along said lines into a continuous non-crystalline material extending through the thickness of the

wafer and having a breaking strength less than the breaking strength of the single crystal material,

converting a portion of said wafer extending through said given thickness and defined by said lines into said non-crystalline material,



removing said beam,and

separating the wafer into individual units by applying a force to said wafer sufficient to exceed the breaking strength of the non-crystalline material but insufficient to break the crystalline material.

3,970,820

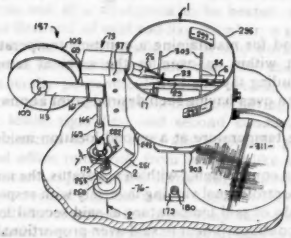
WIRE FED FLASH EVAPORATION SOURCE

Gunard O. B. Mahl, San Francisco, Calif., assignor to CHA Industries, Menlo Park, Calif.

Filed Feb. 3, 1975, Ser. No. 546,596

Int. Cl.² F22B *1/28*

U.S. Cl. 219—271 **11 Claims**



1. A device for evaporating a material within a shell which forms a vacuum chamber and positionable above a baseplate portion of said shell, comprising:

a first electrode grounded to said shell;

a second non-grounded electrode positioned away from said grounded electrode and connected to a power supply;

a resistive heating boat in electrical contact with said grounded electrode and with said non-grounded electrode;

a support adjacent said boat and electrically insulated from said grounded and non-grounded electrodes;

a nozzle communicating with said support and in position to feed a wire onto an evaporation portion of said boat;

means communicating with said nozzle for impelling said wire therethrough;

means for fastening said grounded electrode, said non-grounded electrode and said support in spaced apart relationship from one another; and

means for flowing a single stream of coolant into contact with each of said grounded electrode, said non-grounded electrode and said support.

3,970,821

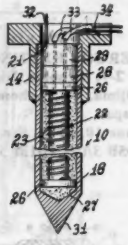
ELECTRICALLY HEATED TORPEDO

Walter R. Crandell, Addison, Ill., assignor to Fast Heat Element Manufacturing Co., Inc., Elmhurst, Ill.

Filed Oct. 21, 1974, Ser. No. 516,618

Int. Cl.² H05B *3/54*; B29F *1/08*

U.S. Cl. 219—523 **6 Claims**



1. An integral heated torpedo for maintaining material passing over an exposed surface thereof at an elevated temperature, comprising, in combination, an unsheathed electrical heating element, lead wires extending from said heating element for electrically connecting said heating element to a power source, a heat conductive torpedo body having a bore closed at one end containing said heating element and a surface on the body in heat transfer relation with said heating element, said surface being adapted to define a passage for said material, said torpedo body being tapered at said closed end, heat transmitting material compacted in the bore and surrounding said heating element for electrically insulating the heating element from the torpedo body and filling all air voids between said torpedo body and said heating element to effect direct heat transfer to the torpedo body from the heating element, insulating means sealing the open end of said torpedo body bore, and temperature control means for regulating the temperature of said heating element and said torpedo body.

3,970,822

ELECTRIC CARTRIDGE HEATER

Ronald M. Wrob, Kirkwood, Mo., assignor to Watlow Electric Manufacturing Company, St. Louis, Mo.

Filed Mar. 17, 1975, Ser. No. 558,846

Int. Cl.² H05B *3/08*, *3/52*

U.S. Cl. 219—541 **2 Claims**

1. In an electric cartridge heater having a metallic tubular sheath of generally circular cross section, an elongate core of generally circular cross section received within said sheath, a resistance wire wound around the outer surface of the core, terminal means for connection of said wire to a power source for energization of the wire, said core being of a crushable ceramic material and being substantially coaxial within said sheath with an annular space between the sheath and the core, and particulate electrical insulating material filling said annular space for providing a conductive heat transfer path between said wire and said sheath and for electrically insulating said wire from said sheath, said sheath with said core and with said particulate insulating material in place within said space being adapted to be compressed by a diameter reduction process thereby to compact said particulate insulative material and to at least partially crush said core; wherein the im-

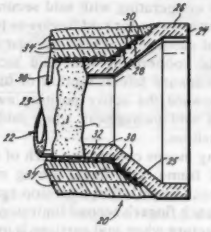
provement of this invention comprises said core having a substantially uniform diameter intermediate its ends and ends of a smaller diameter than said intermediate portion with a transition portion between each of said ends and said intermediate portion whereby upon said heater being compressed during said diameter reduction process, said intermediate portion is crushed more than said transition portions and said particulate insulating material is compacted to form a layer of substantially uniform thickness between said core and said sheath along the entire length of said core.

3,970,823

ELECTRIC HEATER

Joseph A. Volk, Jr., Florissant, Mo., assignor to Beta Corporation of St. Louis, Bridgeton, Mo.

Filed Dec. 5, 1974, Ser. No. 529,755
Int. Cl.² H05B 3/02
U.S. Cl. 219—546 **4 Claims**



1. A heater comprising a rigid, substantial hollow core of heat conductive material, said core having an elongated tapered shank and an enlarged neck portion at the large end of the shank said core being open at the end where the enlarged neck portion is located said neck portion having an externally threaded portion that tapers into the shank, a jacket of electrical and heat insulating material surrounding the core, the inside surface of said jacket being of the same taper as the shank and externally threaded neck portion, an electrical heating element coil secured to the inside surface of said jacket, said element coil following the threads of the externally threaded neck portion and along the shank of said core, and being contiguous therewith, there being a substantial freedom of attachment between said heating element and said core.

3,970,824

ELECTRONIC RECOGNITION AND IDENTIFICATION SYSTEM FOR IDENTIFYING A FAMILY OF CODES

Charles A. Walton, Los Gatos; Robert D. Kohler, Santa Clara, and David P. Sidlauskas, San Jose, all of Calif., assignors to Schlage Electronics, Inc., Sunnyvale, Calif.

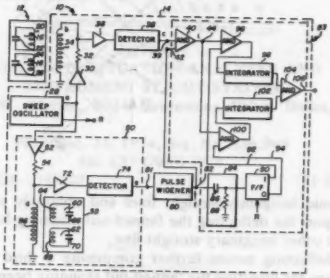
Filed Jan. 13, 1975, Ser. No. 540,659
Int. Cl.² G06K 7/08; G01S 9/56; G06K 19/06
U.S. Cl. 235—61.11 H **9 Claims**

1. An improved electronic recognition and identification system for identifying any one of a family of electrically-coded passive objects each having at least one tuned electrical circuit which is resonant at at least one of a plurality of predetermined frequencies and is adapted to be brought within an external sensing zone, said system comprising:

a sensing coil for providing an electromagnetic field within said external sensing zone when energized by an alternating current signal;

signal source means for generating an alternating current signal for energizing said sensing coil, said alternating current signal having a frequency which varies with time over a range of frequencies including said plurality of predetermined frequencies and having a constant amplitude over said range, whereby when one of the external passive objects is brought within said external sensing zone the object is inductively coupled to said sensing coil by said electromagnetic field and loads said sensing coil when the frequency of said alternating current signal passes through said predetermined frequency such that the potential developed across said sensing coil is changed during the passage of said predetermined frequency;

detector means responsive to the potential developed across said sensing coil and operative to produce a condition pulse each time said potential drops below a predetermined threshold, the duration of said condition pulse corresponding to the time that said potential remains below said threshold;



generator means for producing a reference pulse when said alternating current signal passes through the frequency of the first encountered one of said predetermined frequencies;

pulse widening means responsive to said reference pulse and operative to provide a widened reference pulse having a duration that extends from the time corresponding to the occurrence of said first encountered frequency to the time corresponding to the passage of said alternating current signal through the last encountered one of said predetermined frequencies; and

control signal generating means responsive to said condition pulse and said widened reference pulse and operative to produce a control signal when there is time coincidence between said condition pulse and said widened reference pulse.

3,970,825

APPARATUS AND A METHOD FOR READING LIGHT-DARK OR COLOR-CONTRAST CODES ON ARTICLES

Johann Plöckl, Unterhaching, Germany, assignor to Erwin Sick Optik-Elektronik, Germany

Filed Oct. 3, 1974, Ser. No. 511,703
Claims priority, application Germany, Oct. 6, 1973, 2350278; Apr. 25, 1974, 2419935
Int. Cl.² G06K 7/10; G08C 9/06
U.S. Cl. 235—61.11 E **17 Claims**

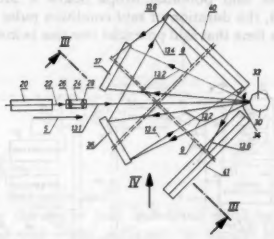
1. Apparatus for reading light-dark or colour-contrast codes on articles which are displaced over a light-transmitting region of a support for the articles of the kind wherein a scanning light beam is directed onto the articles and scattered light reflected. from the articles and codes is supplied to a photoelectric transducer the output signal from which is supplied to electronic evaluating means, comprising:

means located beneath the support for producing a slender scanning beam of light,

beam guiding means including means for fanning-out the scanning beam and means for deflecting the fanned-out scanning beam upwardly through the light-transmitting region of the support and displacing it along two imaginary straight lines located in the light-transmitting region of the

support, said lines extending obliquely to the direction of displacement of the articles and substantially at right angles to one another,

said deflecting means comprising first reflecting means having a planar reflecting surface arranged parallel with one of said imaginary straight lines and obliquely to the said support for deflecting the fanned-out scanning beam along said one imaginary straight line and a second reflecting means having a planar reflecting surface arranged parallel with the other



of said imaginary straight lines and obliquely to the said support for deflecting the fanned-out scanning beam along said other imaginary straight line,

said deflecting means further comprising a third reflecting means for directing the fanned-out scanning beam from the fanning-out means onto the reflecting surface of said first reflecting means and a fourth reflecting means for directing the fanned-out scanning beam from the fanning-out means onto the reflecting surface of said second reflecting means.

3,970,826

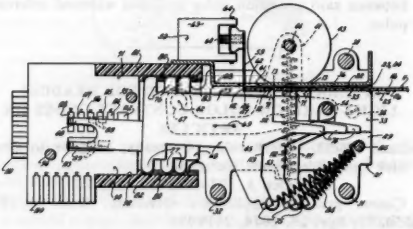
ELECTRO-MECHANICAL CARD READER HEAD

Vermon T. Kleimeyer, and Thomas J. Schinner, both of Cincinnati, Ohio, assignors to General Signal Corporation, New York, N.Y.

Filed Mar. 31, 1975, Ser. No. 563,655

Int. Cl.² G06K 7/04

U.S. Cl. 235—61.11 C **15 Claims**



1. A reader head adapted to read a code provided on a card once that card is inserted into home position within said reader head, said reader head comprising:

a frame defining a passageway sized to receive said card, said passageway including an entry throat at one end through which said card may be inserted along an entry path into a home position within said passageway,

a card sensing carriage pivotally mounted to said frame, said carriage being pivotable between a rest position where a carriage contactor is at least partially disposed within said passageway and a home position where said carriage contactor is biased out of said passageway in response to contact of said card with said contactor upon insertion of said card,

carriage spring means connecting said sensing carriage and said frame, said carriage spring means continuously biasing said carriage contactor into said passageway,

a plurality of code sensing fingers mounted within said frame, each of said fingers being adapted to move laterally in a path parallel to the entry path of said passageway between a rest position and an active position, and each of said fingers being pivotable into and out of said passageway in a plane transverse to the plane of said passageway, the entry point of said fingers into said passageway being positioned forwardly of the entry point of said carriage contactor into said passageway relative to the insertion direction of said card,

a finger restrainer bar fixed to said carriage and extending transverse to said passageway,

a first limit stop mounted to each finger, said restrainer bar cooperating with said first limit stops to prevent said fingers from pivoting into said passageway when said carriage is at the rest position,

a second limit stop mounted to each finger, said reader head structure cooperating with said second limit stop to define a forward stop for said fingers as to lateral movement when said carriage is at both the rest and the home positions, and cooperating with said second limit stops to permit rearward lateral motion of one or more of said fingers toward the active position away from the entry throat of said passageway when said carriage is at the home position,

finger spring means connecting each of said sensing fingers and said frame, said finger spring means continuously biasing each finger's first limit stop against said restrainer bar and each finger's second limit stop against said reader head structure when said carriage is in the rest position to establish said fingers in the rest position, said finger spring means continuously biasing each finger in a pivoting motion against a card positioned within said passageway when said carriage is in the home position relative to said passageway, and said finger spring means continuously biasing each finger's first limit stop against said restrainer bar when said carriage is in the home position until one or more of said fingers is engaged by the code on said card as said card is inserted into said passageway,

one or more of said fingers engaging the code provided on said card to disengage one or more of said fingers' second limit stops from said reader head structure such that one or more of said fingers move rearwardly to an active finger position as said card is inserted through said passageway from one end toward the other into the card's home position, said sensing fingers having been biased against said card after the leading edge of said card has passed said sensing fingers and after said carriage has moved to the home position as said card is inserted into said passageway, and

switch means carried by each of said fingers, said switch means being interconnected with a readout terminal adapted to sense the validity of the card presented to the reader head structure.

3,970,827

ELECTRONIC TAXI FARE METER

Hiroshi Ikuta, Nagoya, and Takaaki Kato, Toyohashi, both of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Nov. 20, 1974, Ser. No. 525,666

Claims priority, application Japan, Dec. 4, 1973, 48-136360; Dec. 4, 1973, 48-136361; Dec. 6, 1973, 48-138415; June 21, 1974, 49-71609

Int. Cl.² G07B 13/10

U.S. Cl. 235—92 TC **18 Claims**

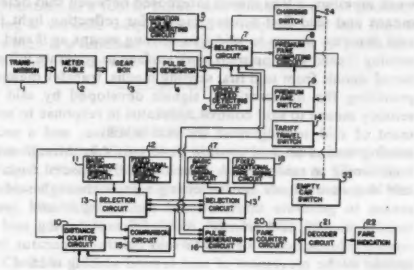
1. An electronic taxi fare meter of the type in which a pulse generator generates a distance pulse each time a taxi travels a predetermined distance and a distance counter circuit counts and operates on said distance pulses to indicate on fare indicating means a fare corresponding to a total distance

traveled in accordance with the result of the operation of said distance counter circuit, said meter comprising:

a premium fare switch for switching at a premium fare traveling of the taxi; and

a premium fare computing circuit connected to said premium fare switch and responsive to the switching of said premium fare switch for computing a premium fare in accordance with a predetermined percentage premium rate *n*, said premium fare computing circuit including:

a scale-of-K counter circuit connected to said pulse generator for dividing the frequency of said distance pulses from said pulse generator by a factor of K;



a premium pulse generating circuit connected to said scale-of-K counter circuit and responsive to an output signal of said scale-of-K counter circuit for generating N pulses corresponding to said percentage premium rate *n* and satisfying $N = K \cdot (n/100)$ and

an addition circuit connected to said premium pulse generating circuit, said pulse generator and said distance counter circuit for adding said N pulses to said distance pulses and the resulting pulses to said distance counter circuit.

3,970,828

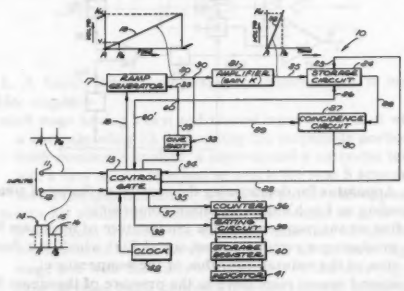
SYSTEM FOR PRECISION TIME MEASUREMENT

Albert M. Klein, Chatsworth, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Jan. 13, 1975, Ser. No. 540,332

Int. Cl.² H03K *21/00, 21/30*

U.S. Cl. 235—92 T **4 Claims**



1. A system for producing a real time precision output, said system comprising: a ramp generator having start and reset inputs, and an output; first means to apply a start signal to said ramp generator start input to cause the output thereof to rise until reset; an amplifier having an input connected from the output of said ramp generator, said amplifier having a gain larger than unity, said amplifier having an output; a sample and hold storage circuit having a sample input, a sample gate input, a reset input, and an output, said storage circuit sample input being connected from the output of said amplifier; a coincidence circuit having an input and an output, said coincidence circuit being connected from the outputs of both said ramp generator and said storage circuit output for producing a main pulse at said coincidence circuit output when the signals at said ramp generator and storage circuit outputs have equal magnitudes; second means to apply a stop signal to said storage circuit sample gate input; and third means connected from said coincidence circuit output to said ramp generator reset input, the first period of time between the occurrences of the said application of said start signal and the production of said main pulse being longer than, but directly proportional to the second period of time between the occurrences of said start and stop signals.

3,970,829

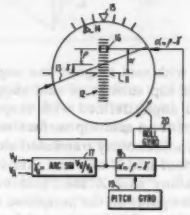
COMPOSITE SITUATION ANALYZER AND INSTRUMENT FLIGHT SYSTEM

William W. Melvin, 8434 Greenstone Drive, Dallas, Tex. 75231

Filed Dec. 23, 1974, Ser. No. 536,948

Int. Cl.² G06G *7/78*

U.S. Cl. 235—150.22 **21 Claims**



1. An aircraft control system display comprising:

an aircraft reference indicator,

a horizon reference indicator,

means for producing a relative displacement of said aircraft and horizon reference indicators as a function of flight path angle of the aircraft,

an angle of attack indicator, and

means for producing a displacement of said angle of attack indicator with respect to said aircraft reference indicators as a function of the difference between the pitch and the flight path angle of the aircraft.

3,970,830

COMPUTER CONTROLLED MACHINE TOOL CONTOURING SYSTEM

Philip H. White; Bernard W. Wilterdink, both of Claremont, and Guy J. Andrews, Londonderry, all of N.H., assignors to Cone-Blanchard Machine Company, Windsor, Vt.

Filed June 24, 1974, Ser. No. 482,782

Int. Cl.² B24B *17/10, 19/08;* **G06F** *15/46*

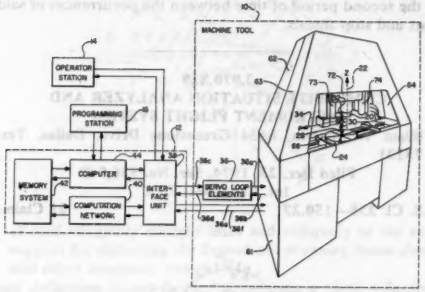
U.S. Cl. 235—151.11 **54 Claims**

1. In a contouring system including a machine tool, said machine tool having a cutting element with a lateral surface which is substantially symmetrical about a first or Z axis, and a workpiece support table having a top surface substantially disposed in a plane perpendicular to said Z axis, wherein said cutting element both rotates about and translates along said Z axis, and wherein said workpiece support table both rotates about a second or C axis, said C axis being parallel to said Z axis, and translates along a third or X axis, said X axis being perpendicular to said Z axis and having a point of intersection with said C and Z axes, the improvement comprising:

a means for controlling said rotating and translating motions of said cutting element and said workpiece support table including:

A. a cutting element drive means for rotating said cutting element at a predetermined angular velocity about said Z axis, and

B. a positioning control means for controlling the relative position of said cutting element with respect to a sequence of predetermined spatial points, each of said spatial points bearing a predetermined spatial relationship to said top surface and each of said points having an associated reference tangent line segment passing



therethrough, with said tangent line segment disposed parallel to said top surface of said support table at a predetermined angle defined with respect to a reference line segment on said top surface so that said support table is synchronously translated along said X axis and rotated about said C axis and said cutting element is translated along said Z axis, said cutting element having a contact point on the periphery thereof successively located at each of said spatial points and said cutting element further having its lateral surface at said contact point successively tangent to each of said reference tangent line segments at its associated spatial point.

3,970,831

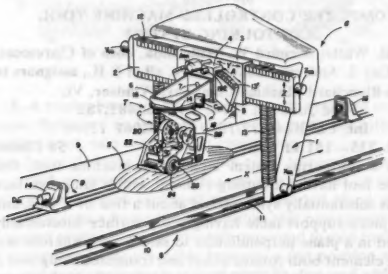
DIGITIZING SYSTEM FOR TAPE PLACEMENT APPARATUS

Tim T. Hegyi, Lomita, Calif., assignor to Goldsworthy Engineering, Inc., Torrance, Calif.

Continuation-in-part of Ser. No. 441,256, Feb. 11, 1974. This application Jan. 8, 1975, Ser. No. 539,288

Int. Cl.[2] B32B *31/00*; G05B *19/18*

U.S. Cl. 235—151.1 **21 Claims**



1. A system for programmably digitizing a control apparatus which provides operation control information to a machine having a work structure movable with respect to a work surface, and which work structure is movable through a plurality of axes including (1) a longitudinal X axis, (2) a transverse Y axis, and (3) an arcuate A axis with movement in an arcuate plane transverse to said X axis and relatively parallel to said Y axis; said system comprising detector means locatable on said work surface defining a desired path of movement of a work member on said work structure, a sensing head replacable on said machine for said work member in substantially the same position which was occupied by said work member, said sensing head comprising a support frame movable by said machine in the X axis and Y axis, a first sensing means associated with said sensing head and spaced from said work surface for detecting said desired path of movement of said work member, a lens means interposed between said detector means and said first sensing means for reflecting light from said detector means to said first sensing means as if said first sensing means were on such work surface to generate informational signals from said first sensing means, transfer means for providing the informational signals developed by said first sensory means to said control apparatus in response to movement of said sensing head on said machine, and a second sensing means on said sensing head movable through a path conforming to said arcuate A axis and also spaced from said said detector means and receiving signals through said lens means to generate informational signals from said second sensing means, said transfer means also providing said last named informational signals to said control apparatus in response to the movement of said second sensing means.

3,970,832

APPARATUS AND METHOD FOR OBTAINING AN ELECTRICAL SIGNAL CORRESPONDING TO THE SPECIFIC ENTHALPY OF STEAM

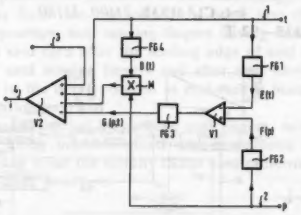
Bruno Itschner, Karlsruhe, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Continuation of Ser. No. 469,621, May 13, 1974, which is a continuation of Ser. No. 286,922, Sept. 7, 1972. This application Mar. 5, 1975, Ser. No. 555,541

Claims priority, application Germany, Sept. 16, 1971, 2146240

Int. Cl.[2] G06G *7/56*; G01K *17/08*

U.S. Cl. 235—151.3 **9 Claims**



1. Apparatus for determining the specific enthalpy of steam according to Koch's state equation comprising

a first means responsive to the temperature of the steam for producing a variable output signal E(t) which is a function of the natural logarithm of the temperature;

a second means responsive to the pressure of the steam for producing a variable output signal F(p) which is a function of the sum of a constant and the natural logarithm of the pressure;

a third means connected to the output of the two means for algebraically adding the variable outputs of said means to form a combined output signal;

means connected to the combining means responsive to the combined signals for producing a variable output signal G(p,t) which is a function of $c^{[F(p)\,-\,E(t)]}$.

means responsive to the temperature of the steam for producing a variable output signal $D(t)$ which is a function of the temperature raised to the -2.82 power;

means connected to the output of the temperature responsive means and a signal proportional to the pressure, said means responsive to both signals for producing a variable output signal which is a function of the product of the steam pressure and the function $D(t)$; and

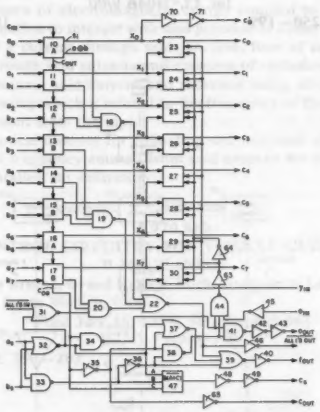
a summing means having four inputs, the variable output signal $G(p,t)$ as a first input, the product of the pressure and $D(t)$ as a second input, the variable signal which is a function of the temperature of the steam as a third input and a signal which is proportional to a predetermined constant as a fourth input, said summing means producing a variable output signal in response to said inputs which is a function of the specific enthalpy of the steam in accordance with Koch's state equation.

3,970,833

HIGH-SPEED ADDER

William Frederick Gehweiler, Moorestown, and Junius Isaac Pridgen, Cherry Hill, both of N.J., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed June 18, 1975, Ser. No. 588,104
Int. Cl.² G06F *7/50*
U.S. Cl. 235—175 **16 Claims**



1. A binary adder comprising, in combination N binary adder stages,

each stage having a first and second input terminal at which a corresponding bit designating the magnitude portion of each number is applied, a carry-in and a carry-out terminal, a first output terminal at which the sum S appears, a second output terminal at which the partial sum appears;

means for serially interconnecting said stages so as to form a full adder wherein the carry-out terminal of one stage is connected to the carry-in terminal of the next higher stage and with the carry-out terminal of the most significant bit stage being connected to the carry-in terminal of the least significant bit stage; and

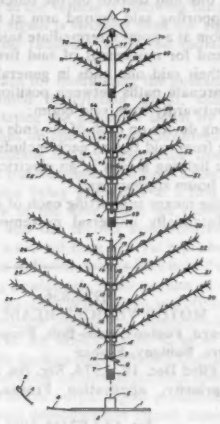
means responsive to the appearance of a 1 logic condition at each of the second output terminals when the binary numbers being added are in the 1's complement format for applying a logic 1 to the carry-in terminal of the least significant bit stage whereby the -0 sum is converted to the $+0$ sum to prevent any oscillations from occurring in the closed loop circuit formed by the interconnections of the carry-out terminals to the carry-in terminals.

3,970,834

ARTIFICIAL TREE

Marion Joseph Smith, Rte. 1, Box 117, Bowman, S.C. 29018

Filed Dec. 16, 1974, Ser. No. 532,944
Int. Cl.² F21P *1/02*; F21V *21/00*
U.S. Cl. 240—10 Q **16 Claims**



1. An artificial tree comprising a plurality of tree sections secured together to form said artificial tree, each of said plurality of tree sections comprising a center shaft, a plurality of slip rings secured to said center shaft, a plurality of sets of branches attached to and emanating from said plurality of slip rings, each of said plurality of sets of branches being supported on each said center shaft by one of said plurality of slip rings, an upper connection peice on the top of said center shaft, and a lower connection piece on the bottom of said center shaft wherein each of said plurality of tree sections further comprises:

a. a plurality of slip collars, and

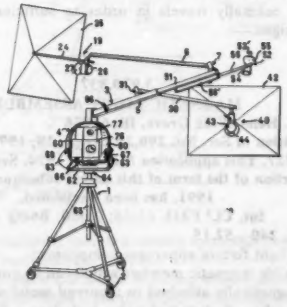
b. a plurality of connecting bars securing said plurality of slip collars rigidly with each other.

3,970,835

PHOTOGRAPHIC LIGHT SUPPORT APPARATUS

Richard C. Crete, 16 South St., Lodi, Calif. 95240

Filed July 7, 1975, Ser. No. 593,513
Int. Cl.² G03B *15/02*
U.S. Cl. 240—1.3 **12 Claims**



1. Photographic lighting apparatus comprising:

a. a mobile boom support having a boom thereon extending laterally outwardly and upwardly therefrom providing an

inner end at said support and an outer end spaced therefrom at a height spaced above a person to be photographed when such person is directly below said outer end;

b. a first arm and a second arm;

c. separate pivot means respectively supporting said first arm at one end thereof on the outer end of said boom, and supporting said second arm at one end thereof on said boom at a point intermediate said inner end and said outer end for movement of said first and second arms about their said one ends in generally horizontally disposed arcuate paths between positions projecting oppositely outwardly from said boom;

d. a lighting device on each of the ends of said arms that are remote from said boom, each including electrical photographic lighting means in an electrical circuit extending to said boom support; and

e. mounting means supporting each of said lighting devices for substantially universal movement relative to said arms.

3,970,836
MOTOR VEHICLE HEADLAMPS

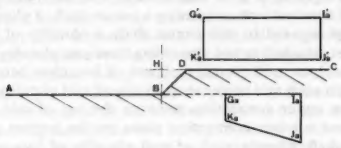
Jacques Ricard, Fontenay-sous-Bois, France, assignor to Cibie Projecteurs, Bobigny, France

Filed Dec. 10, 1974, Ser. No. 531,232

Claims priority, application France, Dec. 26, 1973, 73.46304

Int. Cl.² F21M *3/00*

U.S. Cl. 240—41 R **4 Claims**



1. In a dipped headlamp for a motor vehicle of the type comprising a front glass, cut-out means producing masking of the dipped beam along two horizontal half-planes of cut-out on either side of the central axis and a plurality of juxtaposed prismatic deflecting surfaces associated with said front glass causing the raising of the half-plane of cut-out located on the side on which said vehicle normally travels and producing two horizontal half-planes of staggered height connected by an inclined oblique segment, the improvement comprising an auxiliary dioptric system adapted to intercept a portion of the flux passing through the glass and to raise it above the half-plane of cut-out located on the side of the road on which said vehicle normally travels in order to sufficiently illuminate traffic signs.

3,970,837
MAGNETIC LIGHT ASSEMBLY

Leon E. Helm, Villa Grove, Ill. 61956

Division of Ser. No. 290,231, Sept. 18, 1972, Pat. No. 3,848,227. This application Mar. 18, 1974, Ser. No. 451,887

The portion of the term of this patent subsequent to Nov. 12, 1991, has been disclaimed.

Int. Cl.² F21L *15/16, 25/00;* **B60Q** *1/00*

U.S. Cl. 240—52.15 **2 Claims**

1. A light fixture apparatus comprising:

a flexible magnetic member which can be conformingly and magnetically attached to a curved metal surface;

a plurality of electrical wires including a first wire and a second wire mounted across said member;

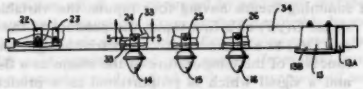
means operable to hold said wires on said member;

a metal bracket fixedly mounted on said member;

fastening means securing said bracket to said member and electrically connected directly to said first wire;

a first light mounted on said bracket and electrically connected to said first wire by said bracket and said fastening means and electrically connected to said second wire;

a second light mounted on said member and electrically connected to at least said second wire;



a magnetic pad having a magnetic sheet and covering adhesively secured together; and,

a flexible cable extending between said magnetic sheet and said covering, said cable hving additional electrical wires connected to said first light.

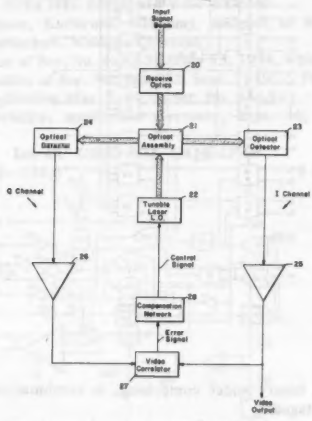
3,970,838
DUAL CHANNEL PHASE LOCKED OPTICAL HOMODYNE RECEIVER

Frank E. Goodwin, Malibu, and Ross E. Graves, Pacific Palisades, both of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Filed Aug. 29, 1975, Ser. No. 608,868

Int. Cl.² H04B *9/00*

U.S. Cl. 250—199 **10 Claims**



6. An optical homodyne receiver comprising, in combination:

first and second optical detectors each having an optical input and a video output;

an optical input signal;

a controllable laser oscillator for generating a local oscillator signal;

an optical assembly coupling said local oscillator signal and said input signal to said first and second optical detectors in adjustable proportions, the portions of said local oscillator signals coupled to said first and second optical detectors differing by substantially 90° with respect to the carrier of said input signal at the optical inputs of said first and second optical detectors;

a video correlator having at least two inputs and an output;

means for coupling the outputs of said optical detectors to the inputs of said video correlator;

means for coupling the output of said video correlator to a control input of said controllable laser oscillator; and

means for deriving a video output signal from one input of said video correlator.

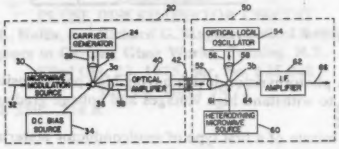
3,970,839
GENERATING AND USING COHERENT OPTICAL RADIATION

Ali Javan, Cambridge, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Division of Ser. No. 389,970, Aug. 20, 1973, abandoned, and a continuation-in-part of Ser. No. 62,380, Aug. 10, 1970, Pat. No. 3,755,678. This application Dec. 20, 1974, Ser. No. 535,023

Int. Cl.² H01J *39/12;* **H04B** *9/00*

U.S. Cl. 250—199 **8 Claims**



1. Apparatus for generating coherent optical radiation comprising at least one antenna connected to a diode junction having non-linear characteristics;

a source of electromagnetic energy coupled to said diode junction to interact with said junction to cause generation of a current through said junction, flow of said current through said antenna and emission of radiation from said antenna, said current and radiation being of optical frequency which is related to the frequency of the input and absent from the input;

an optical element for collecting said radiation of said optical frequency emitted from said antenna for direction to a station for utilization.

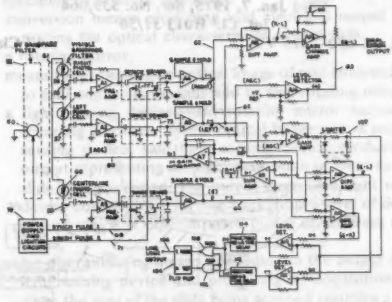
3,970,840
CONTROL CIRCUITRY FOR VEHICLE GUIDANCE MECHANISM

Carl De Bruine, Grand Rapids, Mich., assignor to Lear Siegler, Inc., Santa Monica, Calif.

Filed July 16, 1974, Ser. No. 488,961

Int. Cl.² G05B *1/01*

U.S. Cl. 250—202 **8 Claims**



1. In a vehicle guidance means for guiding a vehicle along a guide line, wherein guidance system radiation means causes the guide line to emit or reflect a guidance signal, sensor means senses the guidance signal and produces a differential error output signal representative of the deviation of the vehicle position from the guide line, and control means automatically controls the position of the vehicle in accordance with the error output signal, the improvement comprising:

feedback means for maintaining a generally constant ratio between error output signal strength and displacement of the guide line from a predetermined centerline position, regardless of the strength of background radiation, said feedback means maintaining said ratio generally constant, as long as the vehicle is following the guide line and the guidance signal is stronger than the signal produced by background radiation when the radiation means is switched on;

modulation means for modulating the guidance signal with a predetermined modulation signal, said modulation means modulating the guidance signal by switching the radiation means on and off at synchronized intervals, the modulation means further generating first and second synchronized pulse signals once each cycle, the first synchronized pulse being generated at a first time interval representative of the time when the radiation means is switched on and the second synchronized pulse being generated at a second time interval representative of the time when the radiation means is switched off, each time interval being a relatively small portion of the total time the radiation means is switched on and off each cycle; and

demodulation circuit means for demodulating the error output signal of the sensor means so as to eliminate the effects of static background radiation and the modulation signal from the error output singal, thus limiting the error output signal to the output signal produced by the guidance signal, said demodulation circuit means comprising synchronized demodulation means for measuring the level of the output signal of each sensor means during each first and second time interval and measuring the difference between said signals, said demodulation circuit further comprising sample and hold amplifier means for producing and holding a DC output signal at a level equal to said difference until the value of the difference signal changes in a subsequent cycle.

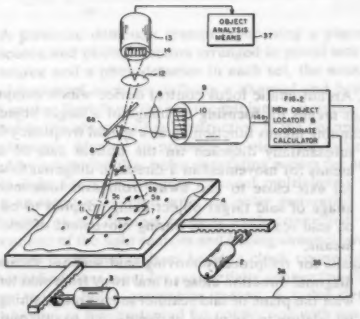
3,970,841
METHOD AND APPARATUS FOR DUAL RESOLUTION ANALYSIS OF A SCENE

James E. Green, Box 734, Fayetteville, Tenn. 37334

Filed Nov. 25, 1974, Ser. No. 526,896

Int. Cl.² H01J *39/12;* **G01N** *33/16*

U.S. Cl. 250—201 **22 Claims**



1. A dual resolution sample scanning apparatus comprising:

means for positioning a sample;

a first opto-electrical image scanning means producing an output signal when a sample object is encountered during scanning;

a second opto-electrical image scanning means for producing output signals representative of a scanned image;

optical means for imaging a low resolution sample field on said first opto-electrical image scanning means and a higher resolution sample field on said second opto-electrical image scanning means;

means responsive to the output signal from said first opto-electrical image scanning means for moving the higher resolution sample field relative to the sample to bring the encountered sample object into the higher resolution field for scanning by said second opto-electrical image scanning means while the first opto-electrical image scanning means continues to scan the low resolution field to detect any other objects in the sample, said continuing low resolution field scan being performed without moving the sample relative to at least one of said resolution fields; and,

utilization means responsive to the output signals from said second opto-electrical image scanning means.

3,970,842

AUTOMATIC FOCUS CONTROL DEVICE

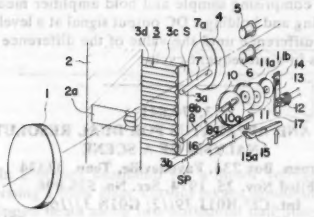
Yasuhiro Nanba, Osaka; Toshinori Imura, Sakai, and Mitsuru Saito, Kaizuka, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed July 8, 1975, Ser. No. 594,076

Claims priority, application Japan, July 30, 1974, 49-87796

Int. Cl.² G01J *1/20*

U.S. Cl. 250—201 **13 Claims**



1. An automatic focus control device which comprises:

lens means for focusing an image of a target object;

scanning means functioning as a spatial frequency filter and substantially disposed on the optical axis of said lens means for movement in a direction diagonal to said optical axis close to and away from said lens means, said image of said target object being adapted to be focused on said scanner means during movement of said scanner means;

means for reciprocally moving said scanner means in said diagonal direction close to and away from said lens means with the plane of said scanner means maintaining a parallel relation to the plane perpendicular to said optical axis;

first means for detecting the amplitude of spatial frequency of said image of said target object projected onto said scanner means through said lens means;

second means electrically connected with said first detecting means for detecting a maximum value of said amplitude of said spatial frequency, said maximum value when detected indicating that the image of said target object has exactly been focused.

3,970,843

PHOTOSENSITIVE JUNCTION DEVICES HAVING CONTROLLABLE SENSITIVITY

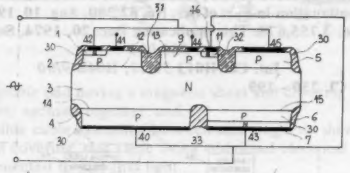
Guy H. Dumas, Paris, France, assignor to Silec-Semi-Conducteurs, Paris, France

Filed Nov. 19, 1974, Ser. No. 525,108

Claims priority, application France, Nov. 30, 1973, 73.42855

Int. Cl.² H01L *27/14*

U.S. Cl. 250—211 J **9 Claims**



1. A photothyristor device having high photosensitivity and ability to withstand high voltages and voltage gradients comprising

a substrate of a first type of semiconductor material having upper and lower major faces;

a first layer of a second type of material on said lower face of said substrate;

a second layer of said second type on said upper face of said substrate;

a third layer of said first type of material on and partially covering the exposed surface of said second layer;

means defining grooves extending through said second layer and into said substrate while leaving portions of said second layer continuous so that an electrical path remains through said second layer between any two points in said second layer,

said grooves exposing planar junction regions between said second layer and said substrate; and

a light-transmitting passivating material filling said grooves to permit irradiation of said junction regions therethrough.

3,970,844

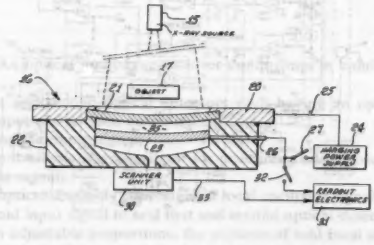
DIRECT CHARGE READOUT ELECTRON-RADIOGRAPHY CHAMBER

John B. Fenn, Jr, Canoga Park, and Murray S. Welkowsky, Sherman Oaks, both of Calif., assignors to Xonics, Inc., Van Nuys, Calif.

Filed Jan. 7, 1975, Ser. No. 539,064

Int. Cl.² H01J *31/50*

U.S. Cl. 250—213 VT **17 Claims**



1. In a system for readout of an electrostatic charge pattern and having an electrode and means for forming an electrostatic charge image on said electrode,

the improvement wherein said electrode includes a first photoconductor layer for receiving the electrostatic

charge and being selectively switchable from a first electrical non-conducting state to a second electrical conducting state by exposure to light, with said first layer returning to said first state when light exposure is discontinued, and a second electrical conducting, optically transparent layer,

and including:

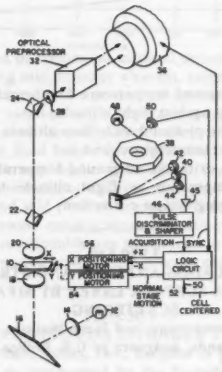
means for scanning a photoconductor switching light beam over said first layer through said second layer; and

means connecting said second layer to storage means for storing data corresponding to the magnitude of charge at points on said electrode which charge is selectively transferred to said second layer through said first layer as said first layer is illuminated by said light beam and switched to said second conducting state.

3,970,845
PULSE DISCRIMINATOR CIRCUIT

David L. Hollis, and Richard G. Magner, both of Raleigh, N.C., assignors to Corning Glass Works, Corning, N.Y.

Filed Oct. 23, 1975, Ser. No. 625,048
Int. Cl.² H01J 39/12
U.S. Cl. 250—214 R **6 Claims**



6. In a system for producing an electrical output representing the optical characteristics of an analytical slide containing a specimen of interest, including:

conversion means producing said electrical output representing the optical characteristics of said slide,

a rotating mirror,

means for projecting an optical image of said analytical slide to said conversion means and to said rotating mirror,

a light sensing device, said rotating mirror successively scanning a portion of said optical image across said light sensing device, said light sensing device producing an output representing the light absorption of the area of the slide being scanned, the output from said light sensing device comprising a varying background level of dc voltage on which is superimposed pulses of different amplitudes,

pulse discriminating means connected to the output of said light sensing device and producing an acquisition pulse when the area of the slide being scanned contains a specimen of interest,

means for producing a synchronizing pulse when said mirror is in a predetermined beam position,

a positioning mechanism for positioning said slide, and

logic circuitry responsive to said synchronizing pulse and to said acquisition pulse for producing control signals, said control signals being used to control said positioning mechanism to position said slide so that the image of a specimen of interest is centered on said conversion means,

said pulse discriminating means being characterized in that it comprises:

a voltage comparator for producing an output signal only when the voltage applied to a first terminal thereof exceeds that applied to a second terminal thereof,

an inverting amplifier,

first connecting means for connecting the output of said light sensing device to the input of said inverting amplifier,

second connecting means for connecting the output of said inverting amplifier to the second terminal of said comparator,

a non-inverting amplifier,

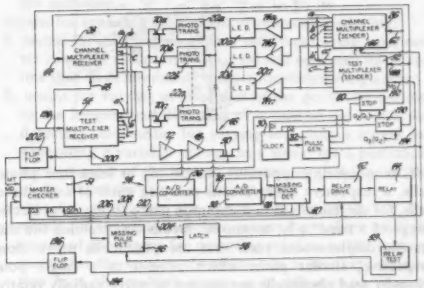
a filter connecting the output of said light sensing device to the input terminal of said non-inverting amplifier, said filter passing said pulses while removing said background level of dc voltage, and

third connecting means for connecting the output of said non-inverting amplifier to the first terminal of said comparator.

3,970,846
PRESENCE DETECTING SYSTEM WITH SELF-CHECKING

George L. Schofield, Jr., and James L. Lignell, both of Ann Arbor, Mich., assignors to Xenex Corporation, Woburn, Mass.

Continuation of Ser. No. 410,861, Oct. 29, 1973, abandoned. This application Aug. 15, 1974, Ser. No. 497,014
Int. Cl.² G01D 21/04
U.S. Cl. 250—221 **6 Claims**



1. A presence detection system comprising a plurality of light source and photodetectors arranged in plural sets with a light source and a photodetector in each set, the source and photodetector of each set defining a channel and being disposed so that light from the source impinges upon the photodetector in the absence of an obstruction in the channel, each photodetector adapted to produce an electrical pulse when excited by a light inpulse, pulse generating means for energizing the light sources, a sender channel multiplexing means having an input connected with the pulse generating means and having plural channel outputs each connected with a different one of the light sources and having channel switching means with a channel address input, a clock connected with the channel address input for sequentially connecting the light sources to the pulse generating means, a pulse detection means having an input adapted for connection with one of the photodetectors, a receiver channel multiplexing means having plural channel outputs each corresponding with a different one of the photodetectors and having channel switching means with a channel address input, a switch connected between each photodetector and pulse detection means and being connected with the corresponding channel output of the receiver channel multiplexing means, said clock being connected with the channel address input for sequentially connecting the photodetectors to the input of pulse detection

means, whereby said multiplexers are switched synchronously by the clock and said channels are sequentially activated with each channel being activated during an activation interval determined by the clock, said pulse generating means being synchronized with the clock to produce a pulse during the activation interval of each channel for transmitting a light pulse from the light source to the photodetector of the same set, said photodetectors thereby being sequentially excited by light impulses whereby said pulse detection means receives at its input a train of pulses including a pulse corresponding to each of the activated channels in the absence of an obstruction in any of the activated channels, said pulse detection means including detector means responsive to a missing pulse in said train of pulses.

3,970,847

DIMENSION MEASURING APPARATUS

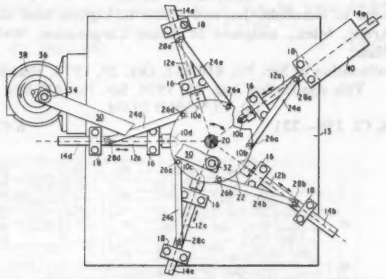
John Keith Wood, 147 Prescot Road, Aughton, Ormskirk, England

Filed Dec. 13, 1974, Ser. No. 532,440

Claims priority, application United Kingdom, Dec. 21, 1973, 59366/73

Int. Cl.² H01J 3/14

U.S. Cl. 250—234 **7 Claims**



7. A measuring apparatus comprising at least four photocells, a respective slider means carrying each of said photocells, for displacement in a common plane to scan a projected image of a zone to be measured, means constraining the sliders for displacement such that the photocells move along respective, similar paths which project to a single point whereby said photocells are caused to move radially relative to that point in scanning the image, and a mechanism for synchronously reciprocating said photocells along said paths, said mechanism including a common, angularly reciprocable member, means mounting said member for angular displacement in a plane parallel to said common plane and about an axis passing through said single point, means for angularly reciprocating said common member in said parallel plane about said axis, and a respective linkage connecting said common member to each slider means and a transducer means arranged to provide a signal indicative of the radial position of one of the sliders relative to said point and hence of the radial positions of all of the photocells relative to that point.

3,970,848

PROFILE TECHNIQUE FOR CALIBRATING INFRARED THERMAL IMAGING SYSTEMS

John R. Schott, Buffalo, and Timothy W. Gallagher, North Tonawanda, both of N.Y., assignors to Calspan Corporation, Buffalo, N.Y.

Filed Aug. 22, 1975, Ser. No. 606,904

Int. Cl.² G01D 18/00

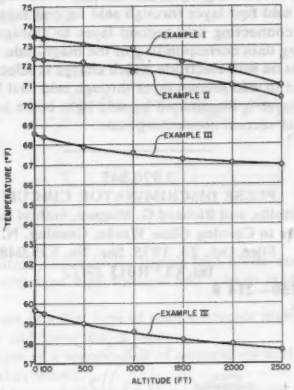
U.S. Cl. 250—252 **9 Claims**

1. A method for calibrating airborne thermal imaging systems including the steps:

selecting a stable reference point;

making a plurality of flights over the selected reference point at altitudes ranging from ground level to flight altitude;

observing and recording the flight altitude and observed temperature for the selected reference point on each flight;



plotting the observed temperature for the reference point on each flight against flight altitude;

extrapolating the plotted data to zero altitude to obtain the actual ground temperature; and

subtracting the extrapolated ground temperature from the observed temperature at flight altitude to obtain the thermal imaging system correction.

3,970,849

DEVICE FOR MASS ANALYSIS AND STRUCTURE ANALYSIS OF A SURFACE LAYER BY MEANS OF ION SCATTERING

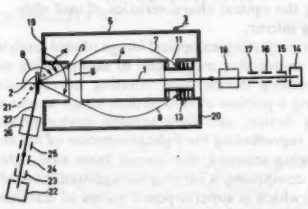
Hidde Herman Brongersma, and Jacob Walinga, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 19, 1974, Ser. No. 525,190

Claims priority, application Netherlands, Dec. 20, 1973, 7317436

Int. Cl.² B01D 59/44

U.S. Cl. 250—281 **2 Claims**



1. A device for mass analysis and structure analysis of a surface layer of a target, comprising: means for generating a primary, substantially monoenergetic ion beam, means for directing said beam to said target; an energy analyzer including two substantially coaxial electrodes for producing an electrostatic radial field therebetween, the center axis of said electrodes coinciding with the intersection of said primary beam and said target, the inner electrode having a substantially annular aperture the position of which relative to said intersection determines the angles of scatter whereas the size of which together with said radial field determines the focal

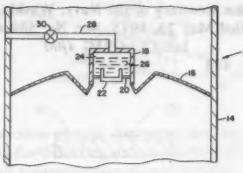
area for the scattered secondary ion beam; and means for detecting the secondary ion beam, said detecting means including a plurality of ion detectors arranged around said center axis in said focal area to detect a plurality of angles of scatter of the secondary ion beam.

3,970,850

POOL COOLING INFRARED TELESCOPE

William D. Jordan, Dallas, Tex., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed May 20, 1975, Ser. No. 579,168
Int. Cl.² G01J 3/02; F17C 7/00
U.S. Cl. 250—352 3 Claims



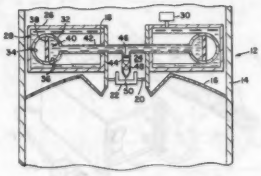
1. A method of cooling an infrared detector element comprising spinning said detector element, subjecting one side of said detector element to a pool of cryogenic fluid that spins as said detector element spins, and subjecting said cryogenic fluid to a low pressure sufficient for dropping the pressure on said cryogenic fluid below the triple point thereof to cause said fluid to form a frozen pool of the cryogenic fluid and thereby cool the detector element, the spinning of said detector element and said pool of cryogenic fluid when subjected to said low pressure causing accelerated freezing of said cryogenic fluid by rotational forces which tend to carry solid particles into the freezing cryogenic fluid to form said frozen pool.

3,970,851

SPRAY COOLING FOR INFRARED TELESCOPE

William D. Jordan, Dallas, Tex., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed May 20, 1975, Ser. No. 579,167
Int. Cl.² G01J 3/02; F17C 7/00
U.S. Cl. 250—352 6 Claims



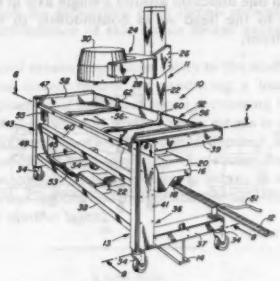
1. A method of cooling an infrared detector element comprising subjecting one side of said detector element to a chamber space of low pressure, and spraying a cryogenic fluid into said chamber space and toward said one surface of said detector element, said low pressure of said chamber being sufficiently low to cause said cryogenic fluid to be dropped below its triple point pressure and thereby cause said cryogenic fluid to flash freeze and deposit on said one surface of said detector element to thereby cool said detector element, said cryogenic fluid being neon.

3,970,852

PROCESS AND APPARATUS FOR SCANNING SECTIONS OF RADIATION

Joseph B. Richey, Shaker Heights; Robert H. Wake, Warrensville Heights, and John T. Keller, Willoughby, all of Ohio, assignors to Ohio Nuclear, Inc., Solon, Ohio

Filed July 8, 1974, Ser. No. 486,398
Int. Cl.² G01T 1/164
U.S. Cl. 250—363 S 32 Claims



1. A radiation sensing device for scanning a section of radiation on a support means comprising:

means for detecting radiation and give electrical impulses in response thereto;

means for operating on the electrical impulses to create a signal which gives an indication of the relative location of the radiation;

means for scanning the section of radiation including:

a. means for selecting an area of radiation having a perimeter in which radiation is detected and operated on at any one time to determine its relative location during a scan;

b. means for varying at least part of the perimeter parallel to the longitudinal direction of a pass of the means for detecting, the means for varying including a means for generating a variable voltage as a signal for a portion of the perimeter of the area of radiation so that the portion of the perimeter is not a distinct edge;

means for controlling the means for detecting and the means for scanning including means for making multiple passes of the means for detecting relative to the support means for the section of radiation in order that information from the multiple passes over different portions of the section of radiation can be blended along the portions of the perimeters without any substantial artifacts.

3,970,853

TRANSVERSE SECTION RADIONUCLIDE SCANNING SYSTEM

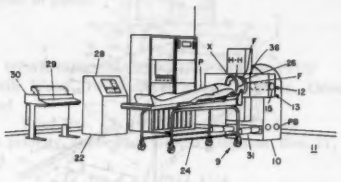
David E. Kuhl, Rosemont, and Roy Q. Edwards, Plymouth Township, both of Pa., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed June 10, 1975, Ser. No. 585,625
Int. Cl.² G01T 1/20
U.S. Cl. 250—363 S 5 Claims

1. Transverse section radionuclide scan field apparatus for use with an electronic system for the high-sensitivity quantification of brain radioactivity in cross-section picture format in order to permit accurate assessment of regional brain function localized in three-dimensions, the apparatus detecting high energy radiation emanating from sources at fixed locations in a human head, and the electronic system producing and displaying therefrom data that corresponds spatially with the location of the sources and quantatively with the intensity of the radiation emanating from the sources in a transverse plane, comprising:

a. means communicating with the electronic system, comprising a system of high energy radiation detectors forming a continuous picture frame line of detectors that completely encloses the scan field in a plane for receiving and detecting said radiation from said sources and producing therefrom data corresponding spatially with the location of the sources and quantitatively with the intensity of the radiation emanating therefrom in a plane transverse to said head;

b. means for rotating said detectors in unison as an integral unit in one direction around a single axis in a plane transverse to the head so as continuously to transmit data therefrom;



c. said means for rotating said detectors rotating the same in a continuous, uninterrupted picture frame line of detectors that are tangent to the scan field and that completely enclose the same around the single axis to produce data corresponding to the spatial location and intensity of the sources; and

d. electromagnetic means for transmitting to the electronic system the data produced by the detectors in response to the detection of the radiation thereby,

the electromagnetic means for transmitting the data from the detectors, comprising laser-emitting photodiodes responsive to the detectors for producing data in the form of light pulses corresponding to the radiation detected.

3,970,854

HIGH SPEED ION BEAM SWITCHING ARRANGEMENT FOR USE IN THE PRODUCTION OF DETERMINATE SOLID BODY DOPINGS BY MEANS OF ION IMPLANTATION

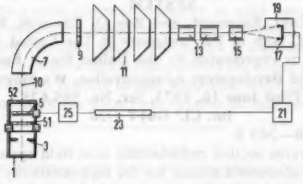
Hartmut Boroffka, Irschenhausen; Eberhard Krimmel, Pullach, and Hartmut Runge, Kirchseeon, all of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed May 20, 1974, Ser. No. 471,283

Claims priority, application Germany, May 23, 1973, 2326279

Int. Cl.[2] H01J *37/00*

U.S. Cl. 250—492 A **13 Claims**



1. In an arrangement for high speed ion beam switching, in the production of determinate implantation doses for the doping, by ion implantation, in solid bodies, which arrangement includes an ion source, a mass separator, a main acceleration system and a lens system, the combination of an electrode interposed in the path of an ion beam from said source preceding the main acceleration system, and switching means for intermittently connecting and disconnecting said electrode from a potential having a value, relative to the kinetic energy of the discharged ions, that upon application of such potential to said electrode, a potential wall will be produced thereat, disposed in the beam path of the ions and having a value exceeding the kinetic energy of such ions whereby the latter cannot pass therethrough, and an ion current integrator operatively disposed to monitor predetermined implantation dosage, operative to control at least the disconnection of the ion beam.

3,970,855

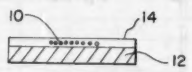
POSITRON PROBES FOR MECHANICAL FATIGUE DETECTION SYSTEM

William H. Holt, and Willis Mock, Jr., both of Fredericksburg, Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 23, 1975, Ser. No. 580,447

Int. Cl.[2] G21G *4/00*

U.S. Cl. 250—493 **9 Claims**



1. A positron-emitting probe for use in testing samples of metals for defects by positron annihilation techniques comprising:

a substrate made from the same material as the test sample;

positron-emitting material supported by one surface of said substrate; and

a cover for said material, said cover being sealed to said substrate to keep said material in place, said cover being of such thinness and density as to provide a window through which positron passage is uninhibited.

3,970,856

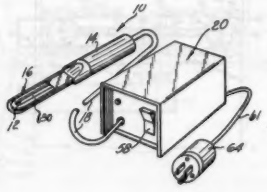
ULTRAVIOLET LIGHT APPLICATOR

James W. Mahaffey, Huntington, N.Y., and Charles J. Ziegler, Cleveland, Ohio, assignors to Cavitron Corporation, New York, N.Y.

Filed May 16, 1975, Ser. No. 578,284

Int. Cl.[2] G01J *1/00*

U.S. Cl. 250—493 **13 Claims**



12. A method of treating the arch of teeth located in a patient's mouth, said method comprising

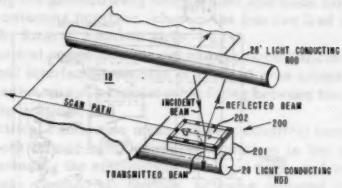
inserting a lens enclosing a means for radiating ultraviolet light in the patient's mouth opposite the arch of teeth, said lens being curved to conform with the shape of a normal human arch of teeth, and

energizing said lamp for a sufficient period to irradiate the arch of teeth opposite the lens with a sufficient amount of ultraviolet light.

3,970,857
APPARATUS FOR WEB DEFECT DETECTION INCLUDING A WEB SWATCH THAT CONTAINS A DEFECT

Gerald Irving Buckson, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Aug. 6, 1975, Ser. No. 602,466
Int. Cl.² G01N 21/32
U.S. Cl. 250—563 2 Claims

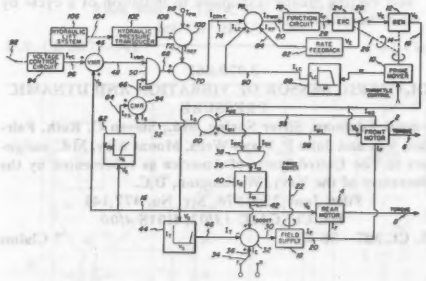


1. In an inspection system for webs that includes means scanning the web for detecting defects in the web and generating output signals representative of said defects, and discriminator circuitry actuated by said output signals for generating alarm signals when said output signals exceed predetermined threshold levels, the improvement comprising: a swatch assembly containing standard defects located adjacent said web in the path of the means for scanning the web, there being output signals normally exceeding said predetermined threshold levels generated during each scan of said swatch assembly; and means for indicating when said inspection system fails to detect said standard defects in each scan.

3,970,858
PRIME MOVER SPEED RESPONSIVE LOAD CONTROL FOR ELECTRICALLY PROPELLED TRACTION VEHICLES

Donald Hammond Rist, and Barry Jay Turley, both of Erie, Pa., assignors to General Electric Company, Erie, Pa.

Filed Feb. 27, 1975, Ser. No. 553,862
Int. Cl.² B60I 11/02
U.S. Cl. 290—14 6 Claims



1. For use in a traction vehicle including electric traction motor means for propelling the vehicle, electrical generating means for supplying electrical energy to said motor means, and thermal prime mover means for driving said generating means at a speed which normally is relatively constant, said prime mover also being adapted to supply power for additional auxiliary loads, an electric propulsion control system adapted to regulate the electrical output of said generating means within given limits and to control the performance of said motor means, said control system comprising:

a. a variable excitation source arranged normally to supply a predetermined maximum level of excitation to the field of said generating means;

b. first means for providing feedback signals which vary as functions of voltage and current levels of the electrical output supplied by said generating means to said motor means;

c. second means for providing reference signals representative of desired performance limits of said motor means;

d. comparison means responsive to said feedback and reference signals for generating error signals indicative of the actual performance of said motor means exceeding said limits;

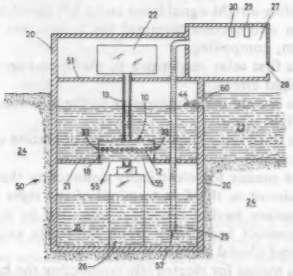
e. load control means responsive solely to the shaft speed of said prime mover means for producing a load control signal indicative of said shaft speed decreasing to angular velocities at which said prime mover means is subject to bogging as a result of excessive load demand; and

f. means associated with said excitation source for modifying the excitation of said generating means as a function of said error signals and independently as a function of said load control signal.

3,970,859
HYDRO-ELECTRIC GENERATION OF POWER FROM SMALL BODIES OF WATER

George Riem, 295 Shuter St., Toronto, Ontario, Canada M5A1W6

Filed Jan. 9, 1975, Ser. No. 539,862
Int. Cl.² F03B 13/10
U.S. Cl. 290—54 4 Claims



1. A means for generating electric energy from a body of water having a depth of at least 4 meters comprising in combination;

a crib having a basin contained therein and being constructed below the bottom of and adjacent said body of water;

a turbine fixed within said crib above said basin;

a means for directing a flow of water from said body of water toward said turbine;

an electric generator means connected to a shaft means rotated by said turbine;

a tank member mounted on the upper structure of said crib and above the upper surface level of said body of water and interconnected to said basin by water siphoning means;

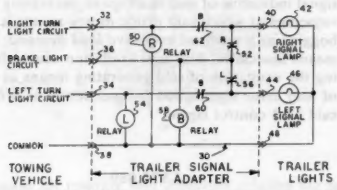
means for alternately creating a vacuum in said tank, drawing water from said basin to fill said vacuum, and then emptying said water from said tank to said body of water.

3,970,860

ELECTRICAL APPARATUS TO CONNECT TOWING VEHICLE LIGHT CIRCUITS TO A TRAILER LIGHT CIRCUIT WHEN THE TOWING VEHICLE HAS SEPARATE CIRCUITS RESPECTIVELY FOR TURNING AND STOP LIGHTS AND THE TRAILER HAS A COMMON LIGHT CIRCUIT FOR BOTH TURNING AND STOP LIGHTS

James P. Purdy, 203 154th Place SE., Bellevue, Wash. 98007

Filed Aug. 23, 1974, Ser. No. 499,897
Int. Cl.² B60Q *1/00*
U.S. Cl. 307—10 LS 2 Claims



1. An electrical apparatus for connecting trailer towing vehicle light circuits to trailer signal light circuits when the towing vehicle has separate circuits for turning and stop lights including a right turn light circuit, a brake light circuit, a left turn light circuit, and a light system common and the trailer has a common light circuit for both turning and stop lights including a right signal lamp and a left signal lamp each having a first and second terminal for connection to an electrical system, comprising:

a. a first relay responsive to the operation of the right turn light circuit;

b. a second relay responsive to the operation of the left turn light circuit;

c. a third relay responsive to the operation of the brake light circuit;

d. a means for electrically connecting the right turn light circuit to the first terminal of the right signal lamp said means having a contact operated by a third relay, the contact being open when the brake circuit is energized and closed when it is not;

e. a means for electrically connecting the brake light circuit to the first terminal of the right signal lamp said means having a contact operated by the first relay, the contact being open when the right turn light circuit is energized and closed when it is not;

f. a means for electrically connecting the brake light circuit to the first terminal of the left signal lamp said means having a contact operated by the second relay, the contact being open when the left turn light circuit is energized and closed when it is not;

g. a means for electrically connecting the left turn light circuit to the first terminal of the left signal lamp said means having a contact operated by the third relay, the contact being open when the left turn signal lamp is energized and closed when it is not;

h. a means for electrically connecting the common to the second terminal of the right signal lamp; and

i. a means for electrically connecting the common to the second terminal of the left signal lamp;

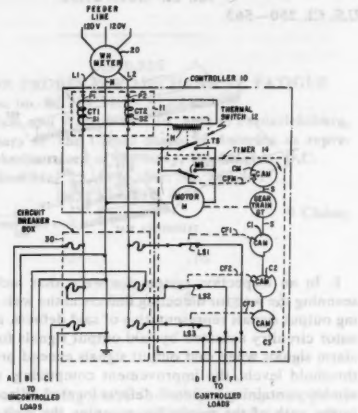
whereby turn and stop signals will appear on the towed vehicle signal lamps when such signals are present on the towing vehicle light circuits.

3,970,861

DEMAND CONTROLLER

Samuel C. McCollum, Springfield, Ill., assignor to Sangamo Electric Company, Springfield, Ill.

Filed Oct. 18, 1974, Ser. No. 515,836
Int. Cl.² H02J *3/00*
U.S. Cl. 307—35 11 Claims



1. In a multiple load control for use with a feeder line which supplies power to controlled and uncontrolled multiple loads:

a thermal switch, first means connecting said thermal switch to said feeder line to monitor the total power being used from said feeder line at any time by said uncontrolled and controlled loads, said thermal switch being operative only whenever the total power supplied by the feeder line to said multiple loads exceeds a predetermined value for a predetermined period of time,

a plurality of load switches for selectably connecting said controlled loads to said feeder line,

cycling means for operating each of said load switches in a present pattern to effect connection of each controlled load to the feeder line at least once in each cycle, and

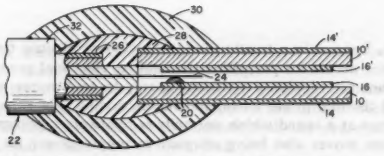
hold means operative to effect completion of each cycle of said cycling means responsive to initiation of a cycle by said thermal switch.

3,970,862

POLYMERIC SENSOR OF VIBRATION AND DYNAMIC PRESSURE

Seymour Edelman, Silver Spring, Md.; Steven C. Roth, Fairfax, Va., and John F. Mayo-Wells, Mount Airy, Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed June 25, 1974, Ser. No. 477,141
Int. Cl.² G11C *13/02*; H01S *4/00*
U.S. Cl. 307—88 ET 7 Claims



1. A polymeric film transducer for sensing dynamic pressure and vibrations comprising:

a first film sandwich comprising a sheet of permanently polarizable polymeric film, one surface being coated with at least one geometrically shaped area of electrically conductive material forming a lead to said geometrically shaped area, the other surface of said polymeric sheet having an electrically conductive coating covering at least the same area as said geometrically shaped area;

a second film sandwich which is a mirror image of the first, said second sandwich being cemented over and in geometrical correspondence with the first, the surface carrying the geometrically shaped films and leads forming the contacting interface, wherein the inactive lead area is in the form of a narrow strip;

electrical connection means making electrical contact with said interfacing coatings in the lead area comprising the center wire of a coaxial cable fitting between the interfacing coatings; and

electrical connection means making electrical contact with both of said outer conductive coatings in the lead area including the metallic shield of said cable and an electrically conductive, flexible, adhesive material extending from the shield to the outer coatings.

3,970,863

ELEMENT AND METHOD FOR DETECTING LEAKAGE OF PETROLEUM PRODUCTS

Hiroshi Kishikawa, Toyonaka; Takayoshi Adachi, Nishinomiya, and Tamio Usami, Kokubunji, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka and Japanese National Railways, Tokyo, both of, Japan

Filed Dec. 13, 1974, Ser. No. 532,600

Claims priority, application Japan, Dec. 18, 1973, 48-142672

Int. Cl.² H01H *35/00*

U.S. Cl. 307—116 **10 Claims**

1. An element for detecting and locating leakage of petroleum product by detecting the change in an electric signal, which element comprises a styrene-butadiene-styrene block copolymer of a butadiene content of 50 to 70% by weight and an electroconductive metal.

3,970,864

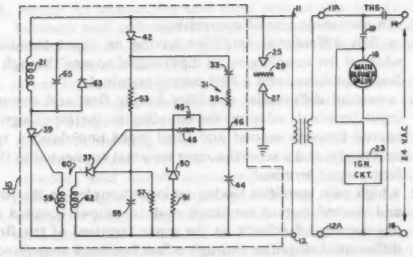
CONTROL ARRANGEMENT FAIL-SAFE TIMING CIRCUIT

Russell B. Matthews, Goshen, Ind., assignor to Johnson Service Company, Milwaukee, Wis.

Filed Mar. 1, 1974, Ser. No. 447,165

Int. Cl.² H01H *7/00*

U.S. Cl. 307—141 **11 Claims**



1. In a control arrangement for activating a system, a fail-safe timing circuit energizable in response to a request signal, said fail-safe timing circuit comprising first switching means operable when enabled to activate the system to commence its operation tentatively, second switching means operable when enabled to enable said first switching means, first timing means including first charge retaining means responsive to said request signal for charging toward a given potential to provide an increasing potential at a first control input of said second switching means, and second charge retaining means responsive to said request signal for discharging from said given potential to provide a decreasing potential at a second control input of said second switching means, said second switching means being enabled when the potential at said second control input decreases to a value which is a predetermined amount less than the potential at said first control input to enable said first switching means, second timing means responsive to said request signal for generating a time-out signal after a predetermined time delay interval for inhibiting said first timing means whereby said first and second switching means are disabled to de-activate the system, and circuit means responsive to a system variable becoming a predetermined condition for preventing said second timing means from generating its time-out signal.

3,970,865

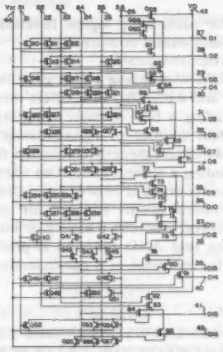
PSEUDO-COMPLEMENTARY DECODE DRIVER

Lewis K. Russell, San Jose, Calif., assignor to Signetics Corporation, Sunnyvale, Calif.

Continuation of Ser. No. 368,855, June 11, 1973, abandoned. This application Nov. 11, 1974, Ser. No. 522,433

Int. Cl.² H03K *19/08*

U.S. Cl. 307—218 **9 Claims**



1. In a decoder circuit having inputs and outputs, a decode driver circuit for forming a plurality of said outputs at output terminals and for selectively coupling each one of the outputs to one of two reference potential levels in response to predetermined coded signal combinations on a plurality of said inputs comprising,

first and second reference potential terminals,

a first plurality of transistors for forming AND circuits where each AND circuit connects between said first reference potential terminal and a different one of said output terminals, said first plurality including parallel first and second transistors and including a third transistor connected in series with both said first and second transistors, said first and third transistors forming a first one of said AND circuits between said first reference potential terminal and a first one of said output terminals, said second and third transistors forming a second one of said AND circuits between said first reference potential terminal and a second one of said output terminals,

a second plurality of transistors connected in parallel to form an OR circuit between said first one of said output terminals and said second reference potential terminal in combination with said first plurality of transistors,

a third plurality of transistors connected in parallel to form an OR circuit between said second one of said output

terminals and said second reference potential terminal in combination with said first plurality of transistors,

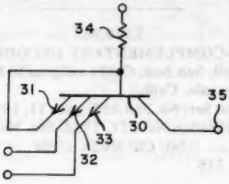
said combined transistors of said first, second and third plurality being connectd to be switched on or off by one of said inputs in a predetermined manner providing a decoded output.

3,970,866

LOGIC GATE CIRCUITS

David E. Fulkerson, Minnetonka, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Aug. 13, 1974, Ser. No. 497,018
Int. Cl.² H03K *19/08, 19/22, 19/34*
U.S. Cl. 307—218 **24 Claims**



1. A circuit for performing logical functions including an AND function, said circuit comprising:

a first gate circuit comprising:

a bipolar transistor having a first gate base, a first gate collector and a plurality of emitters therein, said emitters, including a first emitter, being inputs to receive signals from sources of signals excepting those said emitters which are directly connected to said first gate base including a second emitter so connected; and

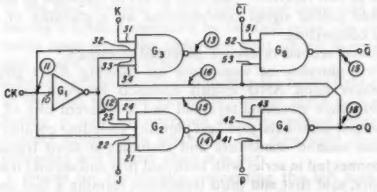
a first resistor connected between said first gate base and a first terminal means adapted for connection to a voltage source, whereby a logic gate circuit capable of performing said AND function is provided including said bipolar transistor as a non-inverting transistor.

3,970,867

SYNCHRONOUS COUNTER/DIVIDER USING ONLY FOUR NAND OR NOR GATES PER BIT

Horst Leuschner, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Feb. 18, 1975, Ser. No. 550,804
Int. Cl.² H03K *21/00*
U.S. Cl. 307—225 R **9 Claims**



1. A synchronous counter/divider circuit comprising:

a. a plurality of serially connected flip-flop stages with each stage receiving outputs from each of the preceding stages;

b. a clock pulse generator;

c. each of said flip-flop stages comprising a pair of multiple input inverting steering gates and a pair of multiple input inverting latch gates, each of said steering gates having a clock pulse input common to said steering gate pair, individual inputs from each preceding stage common to said steering gate pair and a feedback input, each of said pair of latch gates having a feedback input, an input from a corresponding steering gate output of said stage, one additional input and an output connected in common to said feedback inputs of the opposite latch gate and opposite steering gate of said stage, the output of one of said latch gates of each stage being the output of said stage;

d. said clock pulse generator comprising means to produce a clock pulse having a duration of between one and two times the propagation delay time of the slowest of said inverting gates in response to an input clock signal, said clock pulse being applied to said clock pulse inputs of each of said stages; and

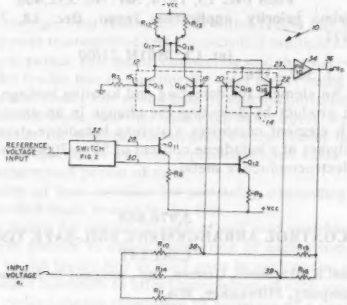
e. said additional inputs of one of said latch gates in each of said stages being connected together as a preset input and said additional inputs of the other of said latch gates of each of said stages being connected together as a clear input.

3,970,868

PHASE COMPARATOR

Ivor K. Clements, Chelmsford, and George R. Spencer, Needham, both of Mass., assignors to Raytheon Company, Lexington, Mass.

Filed June 27, 1975, Ser. No. 590,894
Int. Cl.² H03K *5/20;* **H03F** *3/45*
U.S. Cl. 307—232 **4 Claims**



1. An electronic circuit comprising:

a. a first differential amplifier having an input terminal adapted for coupling to an input signal source through a first impedance and a first output terminal;

b. a second differential amplifier having first and second input terminals adapted for coupling to the input signal source through second and third input impedances, respectively; and a second output terminal connected to the first output terminal;

c. a high gain amplifier having an input coupled to the first and second output terminals and an output coupled in degenerative feedback to the input terminal of the first differential amplifier through a first feedback impedance and also coupled in degenerative feedback to the first input terminal of the second differential amplifier through a second feedback impedance; and

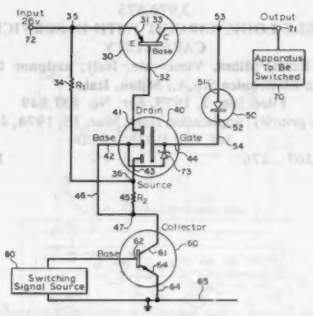
d. switching means, responsive to a reference signal, selectively to actuate the first differential amplifier to couple the input signal to the high gain amplifier through such first differential amplifier or to actuate the second differential amplifier to couple the input signal to the high gain amplifier through such second differential amplifier.

3,970,869

LOW POWER DRIVER

Charles L. Coats, Jr., Laurel, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 3, 1975, Ser. No. 554,894
Int. Cl.² H03K 17/00, 17/60
U.S. Cl. 307—251 4 Claims



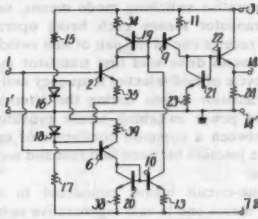
1. An improved low power driver switching circuit having capabilities of high speed switching between "on" and "off" and having a very low current drain, comprising:
   a. a first semi-conductor device having base, emitter, and collector electrodes;
   b. a second semi-conductor device having source, drain, base, and gate electrodes;
   c. a third semi-conductor device having anode and cathode electrodes;
   d. a fourth semi-conductor device having base, emitter and collector electrodes;
   e. an input power circuit having a positive terminal and a low voltage end and including a voltage dividing network;
   f. an output terminal coupled to a device to be switched;
   g. means for connecting said emitter electrode of said first semi-conductor device to the positive terminal of said input circuit, for connecting said collector electrode of said first semi-conductor to said output terminal, and for connecting said base electrode to said drain electrode of said second semi-conductor device;
   h. means for connecting said third semi-conductor device between said collector electrode of said first semi-conductor device and said gate electrode of said second semi-conductor device;
   i. means for connecting said source electrode of said second semi-conductor device to a predetermined point in said input voltage divider network;
   j. means connecting said fourth semi-conductor device between ground and one end of said voltage dividing network, said fourth semi-conductor device receiving switching signals and initiating switching operations;
   k. means for connecting said base electrode of said second semi-conductor device to said low voltage end of said input voltage divider network; said third semi-conductor device maintaining the voltage at said gate electrode of said second device at substantially the input voltage until switching operations is initiated; said voltage dividing network causing voltage at said source electrode to go negative with regard to the input voltage upon initiation of the switching operation, said voltage causing a very rapid switching in response to the initiation of the switching cycle.

3,970,870

SIGNAL RECTIFYING CIRCUIT

Tetsuya Horichi, Yokohama, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Nov. 14, 1974, Ser. No. 523,857
Claims priority, application Japan, Nov. 30, 1973, 48-138761[U]
Int. Cl.² H03K 5/00
U.S. Cl. 307—261 6 Claims



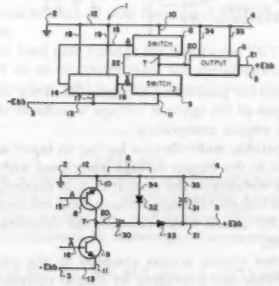
1. A signal rectifying circuit adapted for rectifying an input terminal signal having first and second polarity cycles with respect to a reference terminal, comprising:
   a. an input terminal;
   b. a reference terminal;
   c. a first signal input means connected between the input and reference terminals for inverting at least a portion of the first polarity signal cycle;
   d. a second signal input means connected between the input and reference terminals for inverting at least a portion of the second polarity signal cycle;
   e. a signal inversion means connected to said second signal input means for further inverting at least a portion of said second polarity signal cycle; and
   f. an output signal means connected to both said first signal input means and signal inversion means for providing a rectified output between an output terminal and said reference terminal.

3,970,871

NEGATIVE DC TO POSITIVE DC CONVERTER

Neale A. Zellmer, Belmont, Calif., assignor to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed Feb. 19, 1974, Ser. No. 443,587
Int. Cl.² H02K 1/12
U.S. Cl. 307—262 8 Claims



1. In an inductorless d-c to d-c power converter which inverts an input voltage of one polarity from the output conductor of a power source and supplies power to a load with an output voltage of the opposite polarity and of substantially the

same magnitude, apparatus for improving the conversion efficiency of the power converter which comprises:

regenerative switching mode means having a pair of input terminals for connection to the output of said power source, said regenerative mode means providing a pair of complementary output switching control signals at a selected switching frequency as well as providing a through-path for power from said source;

power switching means comprising first and second transistor means serially connected across the through-path of said regenerative switching mode means, said first and second transistor means each being operatively connected to receive one of the pair of said switching control signals so as to drive said first transistor means during one-half cycle of said selected frequency and to drive the second transistor means during the alternate one-half cycle; said power switching means providing a power output between a common conductor of said through-path and a junction between said first and second transistor means;

transistor sub-circuit means connected to said power switching means and to said regenerative switching mode means, said sub-circuit means being responsive to said switching control signals to provide low-impedance discharge paths to substantially reduce the resetting time of said power switching means when the first and second transistor means are alternately turned off;

an output capacitor means having an input connected to the power output of said power switching means, said output capacitor means providing at its output a voltage of a polarity opposite to the polarity of the voltage of the power source.

3,970,872

CIRCUIT FOR GENERATING A TRIGGER BLANKING VOLTAGE FOR USE IN ANALYSIS OF THE IGNITION VOLTAGE WAVEFORM OF AN INTERNAL COMBUSTION ENGINE

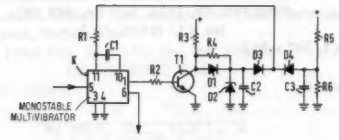
Klaus Roland Kuhn, and Viktor Stigler, both of Karlsruhe, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed June 27, 1974, Ser. No. 483,527

Claims priority, application Germany, July 12, 1973, 2335562

Int. Cl.[2] H03K *5/04*

U.S. Cl. 307—265 **3 Claims**



1. A circuit for generating a trigger blanking voltage useful in the analysis of the ignition voltage waveform of an internal combustion engine comprising:

a. a monostable multivibrator having an input adapted to be coupled to the trigger voltage associated with the ignition voltage waveform, the output of said monostable providing said trigger blanking voltage, said monostable including an RC circuit which controls the duration of its unstable state;

b. capacitor circuit means coupled to the output of said monostable and providing an output coupled to the said RC circuit to thereby control the duration of the unstable state of said monostable comprising:

1. a switching transistor having its base coupled to the output of said monostable;

2. a first resistor in series with the collector-emitter path of said transistor said series combination including said resistor and said collector-emitter path coupled across a voltage; and a capacitor having one terminal coupled to one side of the collector-emitter path of said transistor;

3. a first diode and second resistor in parallel coupling the other side of said collector-emitter path to the other terminal of said capacitor; and

c. means for generating a threshold voltage, said means coupled to said RC circuit through means isolating it from said capacitor circuit means.

3,970,873

BISTABLE LOGIC CIRCUIT WITH IN-SERVICE TEST CAPABILITY

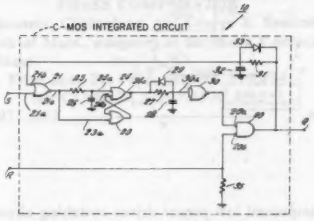
Antonio Banfi, Milan, Vimercate, Italy, assignor to Societa Italiana Elettronica S.p.A., Milan, Italy

Filed Jan. 2, 1975, Ser. No. 537,849

Claims priority, application Italy, Mar. 15, 1974, 49300/74

Int. Cl.[2] H03K *17/00*

U.S. Cl. 307—276 **11 Claims**



1. A bistable binary logic circuit with complete test capability even during normal service, said bistable logic circuit having master set and master reset inputs and a master output, and comprising:

memory means having set and reset inputs and an output;

first gate means having first and second inputs and an output, said second input being coupled to said master reset input, said output being coupled to said master output, for operating a load having a known response time (T_R), if said first input is at a second binary level and said master reset input remains at a first binary level;

first asymmetric delay means for coupling the output of said memory means to the first input of said first gate means after a first predetermined delay (T_1);

second gate means having first and second inputs and an output, said first input being coupled to said master set input, said output being coupled to said memory means reset input, for generating a resetting signal when at least one of its inputs is at a second binary level;

second asymmetric delay means for coupling said master output signal to the second input of said second gate means after a second predetermined delay (T_2);

third delay means for coupling the output of said second gate means to said memory means set input for generating a setting signal after a third predetermined delay (T_3);

whereby an input signal of duration (T_u) applied at a second binary level to said master set input causes the master output to develop said master output signal at a second binary level and remain at the master output signal level if the time interval (T_u) of the input signal (applied for normal operation) is such that the input signal is still present at the master set input when said second delay means delivers the master output signal to the second input of said second gate means and which causes said master output signal to be only briefly maintained if the time interval T_u of the input signal (applied for test purposes) is such that the input signal is removed before the second delay means delivers the master output signal to the second input of said second gate means.

3,970,874

CIRCUITRY FOR CONTROLLING SHUTTER TIME IN ACCORDANCE WITH A MANUALLY ADJUSTABLE RESISTOR

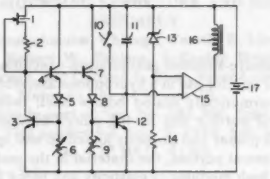
Masahiro Kawasaki, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sept. 6, 1974, Ser. No. 503,841

Claims priority, application Japan, Sept. 12, 1973, 48-106923

Int. Cl.² H03K 5/13; G03B 9/08

U.S. Cl. 307—293 3 Claims



1. In a camera arrangement having a d.c. power source, an electromagnet, a timing capacitor, a timing switch for switchably enabling charging current to flow through the timing capacitor to develop a voltage across the timing capacitor, and switching circuit means connected to respond to the voltage across the timing capacitor to switchably energize the electromagnet, the combination comprising:

a constant current source;

first and second transistors each having a base electrode, an emitter electrode, and collector electrode;

the first transistor having a base-emitter junction between its base and emitter electrode, and having its collector electrode coupled to the constant current source;

the second transistor having a base-emitter junction between its base and emitter electrodes, and having its collector electrode connected to one end of the timing capacitor;

the other end of the timing capacitor being connected to one terminal of the d.c. power source, and the other terminal of the d.c. power source being connected to the emitter electrode of the second transistor so that there is defined a circuit loop through which the charging current flows in an amount which depends upon the magnitude of voltage defined across the base-emitter junction of the second transistor;

first and second resistors;

the first transistor having its base and emitter electrodes connected to opposite ends of the first resistor so that the first resistor is in parallel-circuit relationship with the base-emitter junction of the first transistor;

the second transistor having its base and emitter electrodes connected to opposite ends of the second resistor so that the second resistor is in parallel-circuit relationship with the base-emitter junction of the second transistor;

first and second current amplification circuit means having substantially the same current gain, the first current amplification circuit means being connected between the constant current source and the first resistor so as to serve as a feedback circuit for the first transistor, the second current amplification circuit means being connected between the constant current source and the second transistor; and

one of said first and second resistors being manually adjustable to control the magnitude of the voltage defined across the base-emitter junction of the second transistor so as thereby to control the amount of charging current flowing through the timing capacitor.

3,970,875

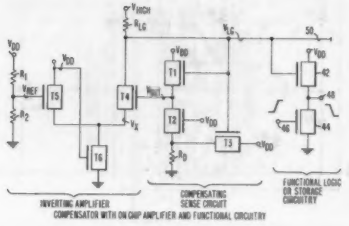
LSI CHIP COMPENSATOR FOR PROCESS PARAMETER VARIATIONS

Gerald William Leehan, Centreville, Va., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 21, 1974, Ser. No. 526,020

Int. Cl.² H03K 3/353

U.S. Cl. 307—304 14 Claims


INVERTING AMPLIFIER
COMPENSATING SENSE CIRCUIT
FUNCTIONAL LOGIC OR STORAGE CIRCUITRY
COMPENSATOR WITH ON CHIP AMPLIFIER AND FUNCTIONAL CIRCUITRY

1. Stabilization and control apparatus comprising:

a semiconductor substrate containing a plurality of functional field effect transistor circuits in the linear load configuration with an FET active device and an FET load device;

a compensating sense circuit integral with said substrate and comprising FET means, for detecting variations in the performance of said FET means resulting from variations in process parameters, and outputting a voltage with magnitude which varies in accordance with said variation in said process parameters;

said FET means including a first FET means having a drain-to-source current whose response to said variations in process parameters is proportional to the response of the drain-to-source current in said FET load device in said functional circuit, to said variations in process parameters;

said FET means further including a second FET means having a drain-to-source current whose response to said variations in process parameters is proportional to the response of the drain-to-source current in said FET active device in said functional circuit, to said variations in process parameters;

an amplifier integral with said substrate and connected to a reference potential, having an input connected to said output voltage from said compensating circuit, for outputting a load gate correction voltage to the gate of the load device in each of said functional FET circuits to be regulated;

whereby the load gate voltage for functional FET circuits is regulated so as to compensate for variations in the process parameters which obtain during the fabrication of the LSI chip.

3,970,876

VOLTAGE AND TEMPERATURE COMPENSATION CIRCUITRY FOR CURRENT MODE LOGIC

William W. Allen, Ambler, Pa., and Herbert Stopper, Orchard Lake, Mich., assignors to Burroughs Corporation, Detroit, Mich.

Continuation of Ser. No. 366,083, June 1, 1973, abandoned. This application Aug. 14, 1975, Ser. No. 604,705

Int. Cl.² H03K 17/00

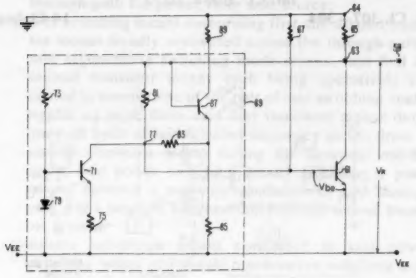
U.S. Cl. 307—310 23 Claims

1. An improved current mode logic (CML) circuit having input thresholds and output levels which are substantially invariant with fluctuations in junction temperature and supply voltage, said logic circuit comprising:

first and second transistors having commonly coupled emitters, the base of said first transistor serving as an input means;

means for generating a control signal which tracks variations in supply voltage on a one-to-one basis and compensates for junction temperature variations of as much as one V_{be}; and

means responsive to said control signal and compensated thereby for supplying a constant current to said commonly coupled emitters.



3,970,877

POWER GENERATION IN UNDERGROUND DRILLING OPERATIONS

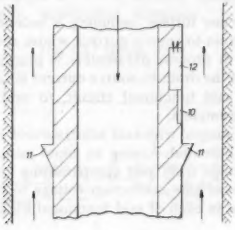
Michael King Russell, 3, Culross Close, and Anthony William Russell, 265, Old Bath Road, both of Cheltenham, England

Filed Aug. 30, 1974, Ser. No. 502,227

Claims priority, application United Kingdom, Aug. 31, 1973, 40989/73

Int. Cl.² H01L *41/10*

U.S. Cl. 310—8.3 **3 Claims**



1. A method of generating electrical power in underground drilling operations which involve the flow of mud past a hollow drill string, said method comprising providing a hollow unit forming part of the hollow drill string, said unit including a vibratory flexible element forming part of the outer surface of the unit so as to be distorted by turbulence in said mud flow and means for producing an electrical voltage in response to distortion of said flexible element, wherein vibration of the flexible element results in the production of an output comprising high-voltage pulses and wherein electronic devices are provided to rectify and smooth said output, providing a projection on the outer surface of said unit below said flexible element, and flowing mud down through the inside of said hollow unit and up past the outside of said hollow unit past said projection and then past said flexible element whereby said projection creates turbulence that distorts said flexible element.

3,970,878

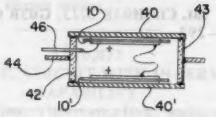
PIEZOELECTRIC TRANSDUCER UNIT AND HYDROPHONE ASSEMBLY

Carl O. Berglund, Houston, Tex., assignor to Teledyne Exploration Company, Houston, Tex.

Filed Mar. 31, 1975, Ser. No. 563,898

Int. Cl.² H01L *41/08*

U.S. Cl. 310—8.6 **12 Claims**



1. A pressure-sensitive acceleration-cancelling piezoelectric transducer unit for use in a hydrophone assembly, comprising:

a. an hermetically sealed hollow shell member having a central portion and having paired mutually-parallel opposed planar end portions joined to and spaced apart by the central portion, the material in the end portions having a high modulus of elasticity and being thin so that the end portions operate as diaphragms deformable inwardly of the shell member by hydro-pressure applied thereto;

b. a piezoelectric wafer attached to the interior surface of each end portion, each wafer comprising a crystal sheet metallized on its opposed surfaces to provide electrodes of opposite polarity, the wafers of opposed end portions being conductively attached to the end portions such that the electrodes of paired wafers having one polarity are attached to the end portions and the electrodes of the opposite polarity face inwardly of the shell member;

c. electrical terminal means each including an insulator member and a conductor member passing through the central portion of the shell member and hermetically sealed thereto, the terminal means being connected inside the shell member with said electrodes of the opposite polarity;

d. means on the outside of the central portion of the shell member for mounting the transducer means in a hydrophone array; and

e. said shell and terminal members being the only parts exposed outside of the transducer unit and consisting entirely of glass and metal hermetically sealed together.

3,970,879

PIEZOELECTRIC ACOUSTIC DEVICE

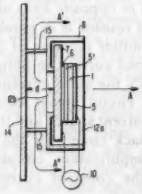
Osamu Kumon, Itami, Japan, assignor to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Dec. 29, 1972, Ser. No. 319,819

Claims priority, application Japan, Dec. 29, 1971, 47-003782[U]; Sept. 26, 1972, 47-112143[U]

Int. Cl.² H01L *41/04*

U.S. Cl. 310—9.1 **4 Claims**



1. In a piezoelectric acoustic device including a planar piezoelectric element mounted in a housing, means for electrically energizing said element to cause mechanical vibration thereof to produce sound waves propagating in opposite directions substantially perpendicular to the plane of said piezo-

electric element toward opposite ends of said housing, the housing having a first opening in one end thereof for passing sound waves propagating in one of said directions, the improvement comprising:

a. a second opening in the other end of said housing for passing sound waves propagating in the other of said directions, and

b. reflector means spaced from said housing for reflecting the sound waves passing through said second opening to cause them to progagate outside of said housing in said one direction and reinforce the sound waves passing through said first opening.

3,970,880

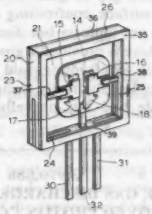
CRYSTAL MOUNTING STRUCTURE AND METHOD OF ASSEMBLY

William B. Deutschmann, Chicago; Corwin E. Livenick, Hickory Hills; Robert W. Paulsen, Arlington Heights; Len A. Tyler, Chicago, and Clifford L. Rose, River Grove, all of Ill., assignors to Motorola, Inc., Chicago, Ill.

Continuation-in-part of Ser. No. 395,305, Sept. 7, 1973, abandoned. This application Aug. 5, 1974, Ser. No. 491,709

Int. Cl.² H01L *41/04*

U.S. Cl. 310—9.4 **15 Claims**



1. A crystal plate mounting structure for mounting a crystal plate having a plurality of electrodes on major surfaces thereof including in combination:

a frame of insulating material defining a central aperture;

a plurality of conductive mounting members each extending through said insulating material and having first portions extending into said aperture;

two of said first portions of said plurality of mounting members extending into said central aperture from substantially opposite directions;

plastic material, having shear and tensile strengths substantially less than the force required to fracture the crystal plate, electrically and mechanically securing said crystal electrodes to said first portions of said mounting members;

said first portions of said mounting members being substantially rigid for reducing flexure of said portions and said crystal plate; and

top and bottom cover members secured to said frame for providing a sealed enclosure.

3,970,881

RECTIFIER ASSEMBLY

Suguru Sato, Ohbu, Japan, assignor to Nippondenso Co., Ltd., Kariya, Japan

Filed Mar. 10, 1975, Ser. No. 556,954

Claims priority, application Japan, Mar. 12, 1974, 49-28871; Oct. 24, 1974, 49-129214; Oct. 28, 1974, 49-130788

Int. Cl.² H02K *11/00*

U.S. Cl. 310—68 D **4 Claims**

1. A rectifier assembly, combined with an alternating current generator having a field winding and a polyphase output winding, comprising;

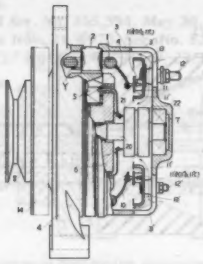
a plurality of pairs of positive and negative diodes;

a positive and a negative cooling fin respectively providing a positive and a negative output terminal;

each of said positive diodes being mounted on said positive cooling fin at its cathode side;

each of said negative diodes being mounted on said negative cooling fin at its anode side;

said polyphase output winding being wound on a stator core of said alternating current generator;



a plurality of leads each respectively interconnecting an anode side of a positive diode with a cathode side of a negative diode;

means connecting said polyphase output winding to said interconnecting leads; and

at least one of said interconnecting leads being disposed in slots within said stator core.

3,970,882

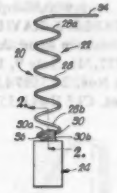
CARBON BRUSH ASSEMBLY

Maurice Victor Dupuis, 8101 Manning, Raytown, Mo. 64138, and Frederick William Hohman, 16130 Harbor Point Drive, Spring Lake, Mich. 49456

Division of Ser. No. 302,918, Nov. 1, 1972, abandoned. This application Nov. 28, 1973, Ser. No. 419,651

Int. Cl.² H02K *13/00*

U.S. Cl. 310—245 **6 Claims**



1. An electrical brush assembly comprising:

a brush of electrically conductive material having a mounting projection; and

a helical compression spring attached to said brush,

said spring comprising a single, spiralled strand of material formed into a first longitudinal series of outer turns of one diameter which defines an elongated cylindrical space within said turns extending from one end of said first series to the opposite end thereof,

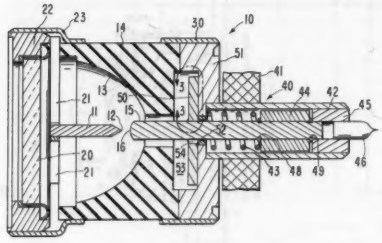
said strand further being formed into a second series of inner turns smaller in diameter than said outer turns which securely receives said projection inside said cylindrical space at all times, whether the spring is compressed or uncompressed,

said inner turns of the single strand being integrally joined to the outer turns, being disposed wholly within said space, and extending from said one end of the first series toward the opposite end thereof.

3,970,883
ARC LAMP WITH MOVABLE ELECTRODE

Gordon R. Lavering, Belmont, Calif., assignor to Varian Associates, Palo Alto, Calif.

Filed Apr. 7, 1975, Ser. No. 565,893
Int. Cl.² H01J 61/52
U.S. Cl. 313—39 15 Claims

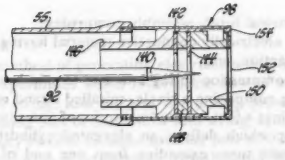


1. An arc lamp comprising a stationary electrode and an elongate movable electrode, means for moving said movable electrode between a first position in which an arc tip thereof is in contact with said stationary electrode and a retracted fixed position in which said arc tip of said movable electrode is spaced apart from said stationary electrode to form an arc gap between the movable electrode and the stationary electrode, said moving means comprising a solenoid armature on said movable electrode, and means for providing a shunt heat-transfer path from said movable electrode at a location between the arc tip of said movable electrode and said armature, the thermal impedance of said shunt heat-transfer path being lower than the thermal impedance from said arc tip through the length of said electrode.

3,970,884
PORTABLE X-RAY DEVICE

John P. Golden, 5740 Warren Road, Ann Arbor, Mich. 48105

Division of Ser. No. 377,741, July 9, 1973, Pat. No. 3,878,394.
This application Nov. 29, 1974, Ser. No. 527,970
Int. Cl.² H01J 35/04
U.S. Cl. 313—55 7 Claims

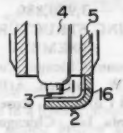


1. In an X-ray source device, an X-ray emitting tube comprising: an envelope, an elongated anode having an emitting end tapering substantially to a point within said envelope and spaced therefrom, and a cathode spaced from said anode and comprising an annular disk of high resistance material disposed coaxially about and uniformly spaced from said emitting end point and in a plane which intersects the tapered end.

3,970,885
IGNITION PLUG FOR INTERNAL COMBUSTION ENGINES

Osamu Kasima, Kariya, Japan, assignor to Nippondenso Co., Ltd., Kariya, Japan

Continuation of Ser. No. 397,905, Sept. 17, 1973, abandoned.
This application June 3, 1975, Ser. No. 583,405
Claims priority, application Japan, Sept. 18, 1972, 47-93988; Sept. 18, 1972, 47-93989; Nov. 20, 1972, 47-117046; Nov. 29, 1972, 47-119697; Dec. 1, 1972, 47-120845
Int. Cl.² H01T 13/20
U.S. Cl. 313—141 6 Claims

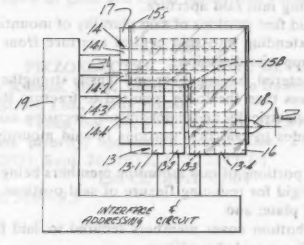


1. An ignition plug for internal combustion engines including a central electrode and an opposed ground electrode with a spark gap therebetween so that a spark discharge is produced in said spark gap to ignite a mixture, said ground electrode having a surface confronting said central electrode a part of which is not uniform but discontinuous, the improvement in which there is provided a groove at the surface of said ground electrode confronting said central electrode, said groove extending longitudinally along the entire length of the ground electrode and but partially through the thickness thereof.

3,970,886
MULTIPLE GAS DISCHARGE DEVICE HAVING IMPROVED PHOTON CONDITIONING

Wolfgang W. Bode, Sylvania; Michael E. Fein, Toledo, and David C. Hinson, Whitehouse, all of Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio

Continuation-in-part of Ser. No. 201,963, Nov. 24, 1971, abandoned. This application Nov. 2, 1973, Ser. No. 412,499
Int. Cl.² H01J 17/20
U.S. Cl. 313—223 11 Claims



6. In a multiple gaseous discharge display/memory device characterized by an ionizable gaseous medium in a gas chamber formed by a pair of opposed dielectric material charge storage members backed by electrode members, the electrode members behind each dielectric material member being transversely oriented with respect to the electrode members behind the opposing dielectric material member so as to define a plurality of discrete discharge volumes constituting discharge units in open photonic communication, the improvement wherein the gaseous medium contains at least one photon conditioning improving gaseous constituent selected from mercury, xenon and krypton which emits high intensity ultraviolet radiation upon excitation, said constituent being present

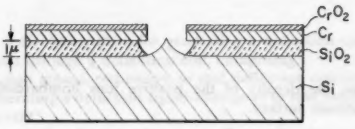
in an amount sufficient to provide an increased number of initial free electrons and improve conditioning of a to-be-addressed discharge unit by photon radiation generated by the discharge of a further discharge unit remotely spaced from said to-be-addressed pair of transversely oriented electrode members at said to-be-addressed discharge unit to discharge same.

3,970,887

MICRO-STRUCTURE FIELD EMISSION ELECTRON SOURCE

Donald O. Smith, and John S. Judge, both of Lexington, Mass., assignors to Micro-Bit Corporation, Lexington, Mass.

Filed June 19, 1974, Ser. No. 480,962
Int. Cl.² H01J 1/02
U.S. Cl. 313—309 18 Claims



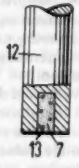
1. A new and improved field emission electron source comprising a semiconductor substrate, an insulating layer formed over a surface of the semiconductor substrate, an overlying conductive layer formed over the insulating layer and at least one field emission cathode site comprised by an opening formed in the insulating layer and overlying conductive layer exposing a part of the underlying semiconductor substrate with the central region of the exposed underlying semiconductor forming a raised emitting tip of semiconductor integral with the underlying semiconductor substrate.

3,970,888

TUNGSTEN-THORIUM DIOXIDE-ALUMINUM OXIDE MASS FOR A HIGH-TEMPERATURE-RESISTANT EMISSION ELECTRODE AND PROCESS FOR THE PRODUCTION THEREOF

Hermann Trattner, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed July 23, 1974, Ser. No. 491,040
Claims priority, application Germany, July 23, 1973, 2337344
Int. Cl.² H01J 1/14, 19/06
U.S. Cl. 313—346 R 15 Claims



1. A mass for emission electrode operating at a high temperature, comprising a mixture of thorium dioxide and aluminum oxide to which is added tungsten powder, with such components being present in the following proportions:

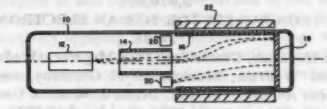
thorium dioxide	33–50%
aluminum oxide	4–15%
tungsten powder	63–35%.

3,970,889

ERASURE MEANS FOR CHARGE STORAGE DEVICE

G. Harold Cobb, Beaverton, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Continuation of Ser. No. 365,394, May 30, 1973. This application Nov. 21, 1973, Ser. No. 525,793
Int. Cl.² H01J 29/08, 29/10, 29/39
U.S. Cl. 313—396 12 Claims



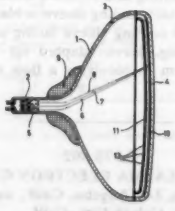
1. A charge storage scan conversion apparatus, comprising:
an evacuated envelope having a longitudinal axis;
storage target means mounted within said envelope, said target means including a storage element of dielectric material provided on a target electrode;
write-read means for producing a low-current first electron beam of narrow divergence angle, said write-read means including first electron gun means;
erase means for producing a high-current second electron beam, said erase means including second electron gun means; and
scanning means for deflecting said first and second electron beams across the surface of said storage target in a predetermined manner.

3,970,890

PLURAL BEAM CATHODE RAY TUBE INCLUDING AN ASTIGMATIC ELECTRON LENS AND SELF-CONVERGING

Henricus Wilhelmus Maria Linssen, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 11, 1974, Ser. No. 531,693
Claims priority, application Netherlands, Jan. 23, 1974, 7400887
Int. Cl.² H01J 29/51, 29/56
U.S. Cl. 313—413 4 Claims



1. A cathode ray tube having means for generating three electron beams the axes of which are located substantially in one plane with the longitudinal axis of the tube, a display screen which extends substantially perpendicularly to the said longitudinal axis and on which the electron beams form three substantially coinciding electron spots, a first astigmatic deflection coil for deflecting the three electron beams in a first direction perpendicular to the said longitudinal axis and parallel to the said plane, and a second astigmatic deflection coil for deflecting the three electron beams in a second direction

perpendicular to the said longitudinal axis and perpendicular to the said plane, of which first deflection coil the meridional image plane coincides substantially with the display screen and the sagittal image plane is located within the tube, and of which second deflection coil the sagittal image plane coincides substantially with the display screen and the meridional image plane is located within the tube comprising means which form an astigmatic electron lens to restrict the dimension of the electron spots in the said second direction, said means comprising a static magnetic quadrupole axis of which coincides substantially with the central electron beam.

3,970,891

ELECTRON COLLECTOR FOR AN ELECTRON BEAM TUBE

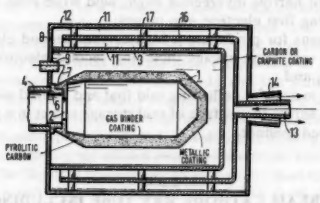
Hinrich Heynisch, Graefelfing; Paul Meyerer, Ottobrunn, and Roland Wolfram, Munich, all of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Jan. 30, 1975, Ser. No. 545,377

Claims priority, application Germany, Mar. 1, 1974, 2409869

Int. Cl.² H01J 25/34

U.S. Cl. 315—3.5 **11 Claims**



1. An electron collector structure for an electron beam tube, comprising: a hollow member for receiving the beam electrons a metallic cooling sleeve surrounding said hollow member and connected to ground, said hollow member electrically insulated from said cooling sleeve for operation at a potential which is different from ground, said hollow member comprising a highly heat resistant material having a low vapor pressure, means mounting said hollow member in a free standing condition within said cooling sleeve, a black coating on the inner surface of said cooling sleeve facing said hollow member, and said cooling sleeve adapted for connection to a forced cooling system to receiving a flow of coolant therethrough.

3,970,892

ION PLASMA ELECTRON GUN

George Wakalopulos, Los Angeles, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed May 19, 1975, Ser. No. 578,551

Int. Cl.² H01J 7/24

U.S. Cl. 315—111.3 **10 Claims**

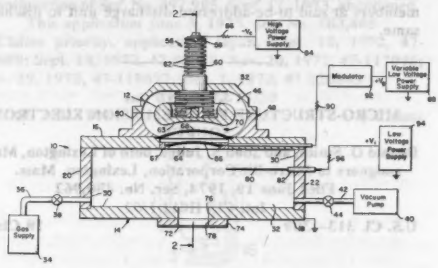
1. An electron gun comprising:

a source of positive ions including a plasma region;

a cathode spaced from said ion source and positioned to intercept positive ions extracted therefrom;

means for applying to said cathode a large negative voltage sufficient to cause positive ions generated by said ion source to bombard a surface of said cathode such that secondary electrons are emitted therefrom to form an electron beam; and

said ion source including grid electrode means disposed between said plasma region and said cathode for controlling the density of the positive ions bombarding said cathode surface.



3,970,893

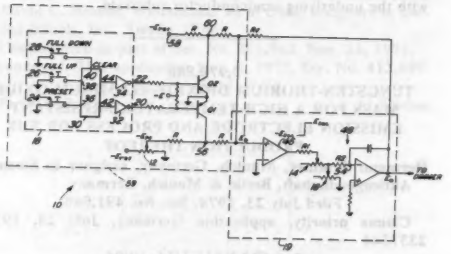
APPARATUS FOR CONTROLLING THE INTENSITY OF LIGHTS

Doyle D. Bryant, Granada Hills, Calif., assignor to Strand Century Incorporated, Elmwood Park, N.Y.

Filed Nov. 27, 1974, Ser. No. 527,922

Int. Cl.² H05B 41/38

U.S. Cl. 315—293 **19 Claims**



1. Apparatus for generating an output signal for controlling the intensity of a light source, comprising:

means for generating a command signal;

comparator means for comparing said command signal to an output signal and for generating a driving signal representative of said comparison;

integrator means responsive to said driving signal for generating said output signal the absolute value of which increases when the absolute value of said command signal is greater than the absolute value of said output signal, decreases when the absolute value of said command signal is less than the absolute value of said output signal, and remains at a constant value when the absolute value of said command signal is equal to the absolute value of said output signal; and

feedback means for applying said output signal to said comparator means.

3,970,894
DEFLECTION SYSTEM

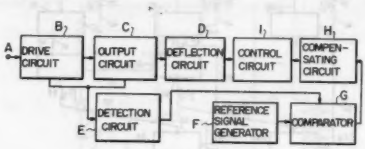
Tooru Yasuda, Yao; Yoshinori Kitamura, Katano, and Ryuhei Nakabe, Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Sept. 3, 1974, Ser. No. 502,796

Claims priority, application Japan, Sept. 3, 1973, 48-99018; Sept. 3, 1973, 48-99019; Sept. 3, 1973, 48-99020; Nov. 19, 1973, 48-131073

Int. Cl.² H01J 29/70

U.S. Cl. 315—370 **16 Claims**



1. A deflection system for generating a deflection current that flows through a deflection coil, comprising:

detection means, responsive to said deflection current, for generating a detection signal analogous to said deflection current;

reference signal generating means for generating a reference signal synchronized to the deflection current;

first circuit means, responsive to both of said detection signal and reference signal, for generating a controlled signal; and

second circuit means for compensating said deflection current in response to said controlled signal.

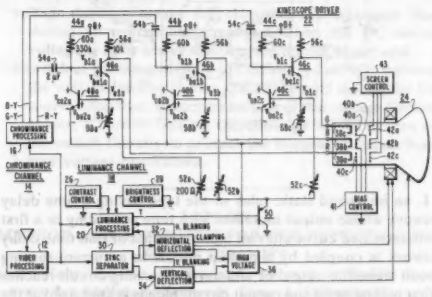
3,970,895
CIRCUIT FOR MAINTAINING OPERATING POINT STABILITY OF AN AMPLIFIER

Donald Henry Willis, Indianapolis, Ind., assignor to RCA Corporation, New York, N.Y.

Filed Sept. 9, 1974, Ser. No. 504,357

Int. Cl.² H01J 29/52

U.S. Cl. 315—381 **7 Claims**



1. In a television receiver including a color kinescope having a plurality of electron beams forming apparatus, electron beam deflection means to control the scanning and retrace of electron beams generated by said electron beam forming apparatus, a source of luminance signals and a source of a plurality of color difference signals, the combination comprising:

a plurality of kinescope driver means each for combining a preselected one of said color difference signals and said luminance signals to derive color signals, each of said kinescope driver means including

first and second semiconductor devices of like conductivity type each having first and second electrodes and a conduction path therebetween and a control electrode for controlling the conduction of the conduction path, said first electrode of said first semiconductor device being direct current coupled to a preselected one of said plurality of said electron beam forming apparatus, said second electrode of said first semiconductor device being direct current coupled to said control electrode of said second semiconductor device, said first electrode of said second semiconductor device being direct current coupled to said control electrode of said first semiconductor device,

capacitive means for capacitively coupling said preselected one of said color difference signals to said control electrode of said first semiconductor device;

means for direct current coupling said luminance signals to said second electrodes of each of said first semiconductor devices; and

means coupled to said deflection means and to said second electrode of each of said second semiconductor devices for selectively applying a direct reference voltage to said second electrode of each of said second semiconductor devices to render it conductive during intervals when said electron beams are being retraced, so that the operating point of each of said kinescope driver means is stabilized in response to said direct reference voltage.

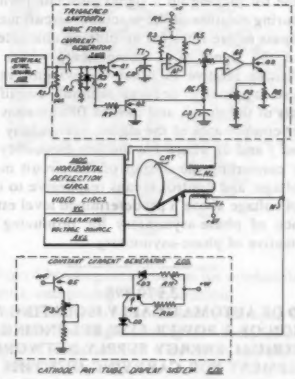
3,970,896
VERTICAL DEFLECTION CIRCUIT

Francis C. Marino, Dix Hills, N.Y., assignor to Redactron Corporation, Hauppauge, N.Y.

Filed Nov. 21, 1974, Ser. No. 525,766

Int. Cl.² H01J 29/72, 29/76

U.S. Cl. 315—387 **11 Claims**



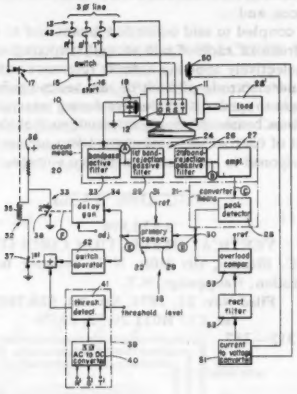
1. Vertical deflection circuit for vertically deflecting the electron beam of a cathode ray tube in response to vertical synchronizing pulses comprising a vertical deflection coil, a reference voltage source connected to one end of said vertical deflection coil, a first current generating means connected to the other end of said vertical deflection coil, for generating a current having a repetitive sawtooth waveform in synchronism with the vertical synchronizing pulses, and a second current generating means, connected to the other end of said vertical deflection coil, for generating a constant current whose amplitude is selectively adjustable in order to control the vertical starting position of the electron beam of the cathode ray tube.

3,970,897

DETECTOR AND APPARATUS INCORPORATING THE SAME FOR DETECTING PHASE-ASYMMETRY AND PROTECTING THREE-PHASE MOTORS AGAINST DANGEROUS OPERATING CONDITIONS

David Tamir, Jerusalem, and Michael S. Erlicki, Haifa, both of Israel, assignors to Technion Research and Development Foundation Ltd., Haifa, Israel

Filed Apr. 22, 1974, Ser. No. 463,199
Claims priority, application Israel, Apr. 30, 1973, 42142
Int. Cl.² H02H 7/08
U.S. Cl. 317—13 R 14 Claims



1. A detector for detecting phase-asymmetry in connection with a three-phase machine comprising a sensor couplable to the machine for picking up a signal associated with the leakage field during rotation of the machine; circuit means including a bandpass active filter for amplifying characteristic components of the signal (i.e., components whose anplitudes greatly increase relative to other components in the signal when phase-asymmetry occurs) without amplifying other components of the signal, and passive filter means for attenuating other components of the signal, particularly at frequencies around f and $3f$ where f is the line frequency; converter means for converting the output of the circuit means into a control voltage; and control means responsive to increases in the control voltage above a predetermined level established in the absence of phase-asymmetry for producing an output signal indicative of phase-asymmetry.

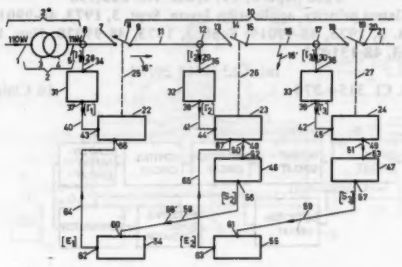
3,970,898

METHOD OF AUTOMATICALLY ISOLATING A FAULTY SECTION OF A POWER LINE BELONGING TO AN ELECTRICAL ENERGY SUPPLY NETWORK, AND ARRANGEMENT FOR CARRYING OUT THIS METHOD

Eduard Baumann, Uster, and Candidus A. Waldispuhl, Zurich, both of Switzerland, assignors to Zellweger Uster AG, Uster, Switzerland

Filed Nov. 4, 1974, Ser. No. 520,733
Claims priority, application Switzerland, Nov. 23, 1973, 16520/73
Int. Cl.² H02H 7/26
U.S. Cl. 317—25 17 Claims

1. A method of automatically isolating a faulty section of a power line of an electrical supply network, the power line being adapted to be connected to at least one energy source and to be temporarily divided up into sections by switches following the appearance of an excess current, and automatically reconnecting normally operating sections of the power line to said at least one energy source, the improvement comprising the steps of transmitting a signal from the location of at least one switch, when said one switch is open, which has automatically opened after an excess current has passed through it through a non-faulty part of the power line to at least one other switch through which at least a part of the



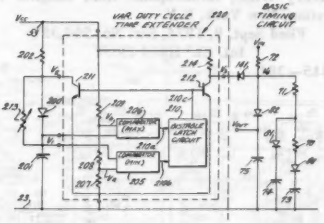
excess current had passed to the now opened said one switch, and which other switch has also automatically opened, reception of the aforementioned signal being an essential requirement for closing said other switch.

3,970,899

INTEGRATED CIRCUIT LINEAR TIME DELAY EXTENDER FOR STATIC RELAYS

Lee A. Davis, Audubon, N.J., assignor to I-T-E Imperial Corporation, Spring House, Pa.

Filed Feb. 3, 1975, Ser. No. 546,622
Int. Cl.² H02H 3/08
U.S. Cl. 317—33 R 10 Claims



1. an improved static relay of the type having a time delay network whose output increases with time according to a first predetermined curve after an input terminal of said time delay network is coupled by a pickup circuit to a current-sensing circuit when the output of said current-sensing circuit reaches a first pickup level and output circuit means is energized at the end of a first time interval required for said time delay network output to exceed a first predetermined value, wherein the improvement comprises:

first means for providing a substantially constant supply voltage level;

charging means coupled to said first means for charging at a first rate;

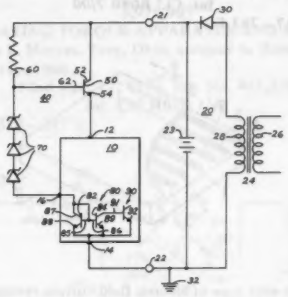
second means coupled to said charging means and activated in response to said charging means reaching said first predetermined charging level for suspending the charging of said time delay network;

fourth means coupled to said charging means for deactivating said second and third means when said charging means has discharged to a second predetermined level to thereby enable said time delay network and said charging means to resume charging.

3,970,900
OVERVOLTAGE PROTECTION FOR AN INTEGRATED CIRCUIT

Robert G. Hodgins, Canastota, N.Y., assignor to General Electric Company, Carmel, Ind.

Filed Dec. 19, 1974, Ser. No. 534,650
Int. Cl.² H02H 3/28
U.S. Cl. 317—31 **6 Claims**



1. Overvoltage protection means for a monolithic integrated circuit comprising:

a pass transistor having a collector and an emitter connected serially with the integrated circuit across a DC energy source;

a current source for providing continuous base drive for the pass transistor when the DC source is operative for assuring conduction of the transistor to energize the integrated circuit and in a nonovervoltage condition when the DC source voltage is below a predetermined value to preserve low power dissipation in the circuit by allowing only a low-voltage drop across the current source and the transistor base-emitter;

voltage limiting means for clamping the transistor base during an overvoltage condition when the DC source voltage is at or above the predetermined value; and

a switch in the integrated circuit connected serially between the voltage limiting means and the ground side of the DC source such that, upon conduction of the voltage limiting means, a current flowing therethrough serves to turn on the switch thereby to protect the integrated circuit from high voltage breakdown.

3,970,901
METHOD AND APPARATUS FOR THE DETECTION OF SHORT CIRCUITS

André Rohr, Geneva, Switzerland, assignor to Societe Anonyme des Ateliers de Secheron, Geneva, Switzerland

Filed Dec. 6, 1974, Ser. No. 530,152
Claims priority, application Switzerland, Dec. 14, 1973, 17525/73
Int. Cl.² H02H 3/16
U.S. Cl. 317—49 **22 Claims**

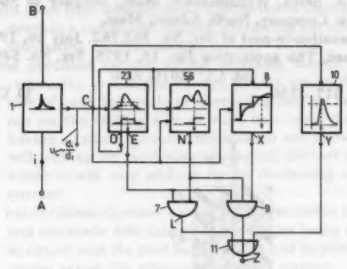
1. A method for the detection of short circuits in electrical installations, in particular on railway contact wires, comprising:

generating a signal corresponding to the time derivative of the monitored current,

comparing the generated current time derivative signal with a first limit value,

generating, in case of the current time derivative signal exceeding the first limit value, a replica signal corresponding to the wave-form of the monitored current from the moment of the exceeding onwards,

comparing the replica signal with at least one further limit value and

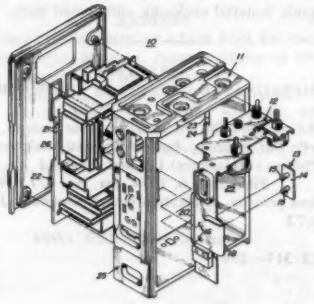


providing a short circuit condition indication signal if the at least one further limit value is exceeded.

3,970,902
HOUSING ARRANGEMENT FOR MINIATURIZED ELECTRONIC DEVICES

William M. Brettman, Margate, and David L. White, Launderhill, both of Fla., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Mar. 13, 1975, Ser. No. 558,044
Int. Cl.² H05K 7/06
U.S. Cl. 317—120 **3 Claims**



1. An improved housing arrangement for miniaturized electrical apparatus, comprising in combination:

a housing formed of a resilient material with open front and back faces, the housing including shoulders formed along opposing side walls thereof with offset tab portions extending laterally inwardly;

a rigid base chassis for retaining associated electrical components thereon and having a plurality of connection terminals, the chassis having edge portions overlying and resting upon said housing shoulders, the chassis further including notched portions receiving said housing tab portions and maintaining the chassis within the housing and in contact with the shoulders;

a flexible circuit member having a non-rigid base and serving to effect electrical interconnections, the flexible circuit member including connector means interconnecting to the plurality of connection terminals on the rigid base chassis, the connector means hingeing the rigid base chassis to the housing; and

strain relief means for the flexible circuit member, including snap-in, retainer means releasably securing a portion of the flexible circuit member to a side of the housing.

3,970,903

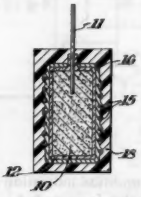
SOLID ELECTROLYTIC CAPACITOR WITH EMBEDDED COUNTERELECTRODE

George A. Shirn, Williamstown, Mass., assignor to Sprague Electric Company, North Adams, Mass.

Continuation-in-part of Ser. No. 382,782, July 26, 1973, abandoned. This application Jan. 10, 1975, Ser. No. 540,028

Int. Cl.² H01G 9/00

U.S. Cl. 317—230 11 Claims



1. In a solid valve-metal capacitor having a porous valve-metal body, a valve-metal oxide film covering all surfaces of said porous body and a coating of manganese dioxide overlying and in contact with said oxide film; the improvement comprising a conductive counterelectrode member having a surface portion that is inert to manganese dioxide at temperatures as high as 450°C, said inert portion being buried in said manganese dioxide coating and another portion of said member extending outside said coating for the purpose of serving as the cathode lead of said capacitor; and a housing formed of an organic material enclosing said coated body.

3,970,904

IMPREGNATED CAPACITOR AND METHOD OF MANUFACTURE

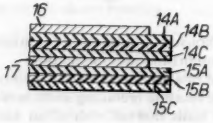
John Edward Murfitt, Ditchingham, near Bungay, and Alastair Martin Pitt, Sudbury, both of England, assignors to Johnson & Phillips (Capacitors) Limited, England

Filed June 6, 1974, Ser. No. 477,319

Claims priority, application United Kingdom, June 6, 1973, 26966/73

Int. Cl.² H01G 4/20, 13/04

U.S. Cl. 317—258 16 Claims



1. In a method of making a capacitor element comprising the steps of

a. interwinding electrode foils and layers of substantially non-porous dielectric film, to form a winding, and

b. impregnating said winding with a dielectric liquid,

the improvement according to which said foils and said layers in said winding are interwound under conditions such that the foils and films of said winding are at sufficiently different tensions that at least one of each pair of adjacent foil and film surfaces is corrugated during winding to form passages extending transversely to the lengths of said layers between said adjacent surfaces, which passages assist entry of said impregnating liquid between said foils and said layers.

3,970,905

THIN WIRE TYPE OF ELECTRIC FIELD CURTAIN SYSTEM

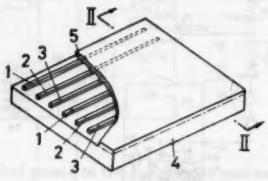
Tsutomu Itoh, Tokyo; Munekazu Sakurai, Kitamoto; Masahiro Yamamoto, Chiba, and Yasunari Okamoto, Tokyo, all of Japan, assignors to Onoda Cement Company, Ltd., Onoda, Japan

Filed July 3, 1975, Ser. No. 593,105

Claims priority, application Japan, July 10, 1974, 49-78224; July 10, 1974, 49-78225

Int. Cl.² B08B 7/00

U.S. Cl. 317—262 E 8 Claims



1. A thin wire type of electric field curtain system including a plurality of linear electrodes embedded in an insulator layer in parallel to each other along the surface of said insulator layer wherein said system comprises silent discharge means including power supply means coupled to said linear electrodes for providing curved electric lines of force which extend outwardly in a convex pattern from the surface of said insulator layer, and wherein the width of each of said plurality of linear electrodes is chosen equal to or less than 3 mm.

3,970,906

BRAKING DEVICE FOR THREE-MOTOR TYPE TAPE RECORDER

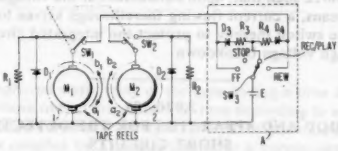
Masahiro Komatsubara, Tokorozawa, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Nov. 19, 1974, Ser. No. 525,264

Claims priority, application Japan, Nov. 19, 1973, 48-132665[U]

Int. Cl.² B65H 59/38

U.S. Cl. 318—7 6 Claims



1. In a tape recorder including a first D.C. motor for driving a tape supply reel and a second D.C. motor for driving a tape take-up reel with recording tape wound on the two reels, and switch means connected between said motors and a power supply for selectively energizing and deenergizing both motors simultaneously, an improved braking system comprising:

a first unidirectional current conducting element and a first resistor connected via said switch means in parallel with said first motor; and

a second unidirectional current conducting element and a second resistor connected via said switch means in parallel with said second motor;

said unidirectional current conducting elements being poled such that, upon simultaneous deenergization of both motors, a first regenerative braking current generated by one motor flows in the forward direction through its

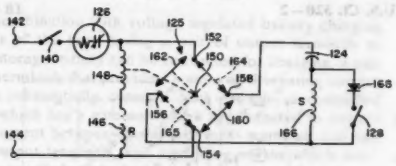
parallel-connected unidirectional element to immediately brake said one motor to a stop, and a second regenerative braking current generated by the other motor is blocked by its parallel-connected unidirectional element and flows only through its parallel-connected resistor, whereby said second regenerative braking current is less than the first, so that the braking force on said other motor is less than that on said one motor, thereby stopping a running tape without producing slack therein.

3,970,907

PULSATING TORQUE APPARATUS AND METHOD

Theodore F. Meyers, Troy, Ohio, assignor to Hobart Corporation, Troy, Ohio

Filed Apr. 17, 1974, Ser. No. 461,638
Int. Cl.² H02P 1/42
U.S. Cl. 318—207 C **36 Claims**



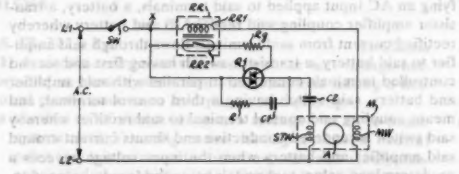
1. A waste disposer device comprising:
a substantially hollow cylindrical stator member;
a rotor member contained within said stator member and defining therewith a receptacle for receiving waste material, said rotor and stator members including cooperating teeth members;
means including an induction motor for driving said rotor member;
first control means for generating unidirectional rotation in said means for driving;
second control means including means for simultaneously applying alternating and direct current to said means for driving for generating rapidly fluctuating bidirectional rotational movement in said means for driving, to provodie disintegrating action between said rotor and said stator members.

3,970,908

A.C. MOTOR STARTING SYSTEM

James E. Hansen, Oak Creek, and Eugene R. Schmit, Elm Grove, both of Wis., assignors to Cutler-Hammer, Inc., Milwaukee, Wis.

Filed Dec. 9, 1974, Ser. No. 530,768
Int. Cl.² H02P 1/44
U.S. Cl. 318—221 E **7 Claims**



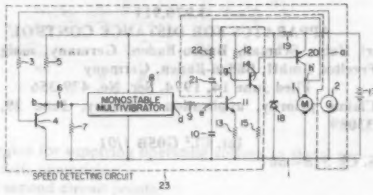
1. An A.C. motor starting system supplied from an alternating current source for controlling a motor having a rotor, a run field winding and a start field winding including means for shifting the phase of the start field winding with respect to the run field winding to provide a rotating magnetic field for starting, comprising:
a precision current sensor having an operating coil and a contact;
means applying alternating current from the alternating current source to said operating coil;
said main field winding being connected in circuit with said operating coil to also receive alternating current from the alternating current source;
said precision current sensor including means making it responsive to and fast enough to pick up on the leading side of each half-cycle of alternating current and to drop out on the trailing side of each half-cycle thereof, and having a critical current amplitude at and above which it will pick up on increasing alternating current and below which it will stop picking up on decreasing alternating current;
a bidirectional thyristor having main electrodes and a control electrode with said main electrodes being connected in circuit with the start field winding and its phase-shifting means across the alternating current source;
and means connecting said contact between one side of the alternating current source and said control electrode whereby upon application of power to the system said operating coil responds to the main field winding current to operate said contact and apply a firing current to said control electrode for a substantial time range during each half-cycle of the run field winding current, which substantially overlaps, due to phase-shift, the point where the start field winding current passes through zero, thus to insure refiring of said thyristor at the beginning of each half-cycle of its current, and said operating coil stops the closing of said contact at said critical level of the decreasing main field winding current as the motor approaches its running speed, thus to discontinue energization of the start field winding at a precisely controllable point.

3,970,909

CONSTANT SPEED REGULATOR FOR DC MOTOR

Hiroshi Minakuchi, Kadoma, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Japan

Filed Aug. 29, 1974, Ser. No. 501,848
Claims priority, application Japan, Sept. 10, 1973, 48-102522
Int. Cl.² H02P 5/16
U.S. Cl. 318—341 **11 Claims**



1. A constant speed regulator for a DC motor comprising
a. a positive feed line and a negative feed line one of which is a common power source line connected to one terminal of said DC motor,
b. a positive source line and a negative source line one of which is a common power source line,
c. a means for stabilizing the voltage between said positive feed line and said negative feed line,
d. a speed detecting circuit for generating DC voltage or DC current corresponding to the speed of DC motor, said feed lines being connected to said speed detecting circuit to supply operating current therefore, whereby, due to said stabilizing means, the output DC voltage or DC current from said speed detecting circuit is not influenced by the change in power voltage between said source lines,

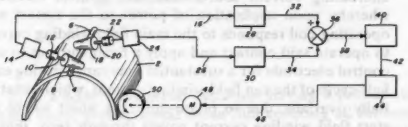
e. a driving transistor having its emitter-collector path connected between the other power source line and the other terminal of said DC motor, and

f. an AC negative feed-back means connected between an output terminal of DC voltage corresponding to the speed of said DC motor and said other terminal of said DC motor, whereby, said AC negative feed-back means decreases the AC ripple component of the power voltage applied to said DC motor.

3,970,910
WELD TRACKING MECHANISM

Donald G. Schindler, Whitehall Boro, Pa., assignor to United States Steel Corporation, Pittsburgh, Pa.

Filed Sept. 30, 1974, Ser. No. 510,685
Int. Cl.[2] G05B *19/36*
U.S. Cl. 318—576 **5 Claims**



1. A system for sensing lateral movement of a narrow longitudinally moving object away from a lateral reference position and for moving the object laterally to the reference position comprising

a pair of adjacent conical shaped contact rollers adapted to contact the moving object and to be rotated by longitudinal movement of the object,

each of said rollers being mounted on a shaft generally at right angles to the longitudinal dimension of the object and with the large ends of the rollers opposed whereby a lateral reference position is established when the object contacts the rollers at equal roller diameters,

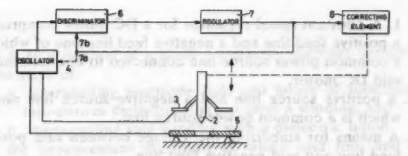
means connected to each shaft for providing electrical signals indicative of shaft rotation, and

means connected to the means for providing electrical signals and responsive to different electrical signals for laterally moving the longitudinally moving object to the reference position.

3,970,911
APPARATUS FOR DISTANCE CONTROL

Karl Heinz Schmall, Baden-Baden, Germany, assignor to Precitec GmbH, Baden-Baden, Germany

Filed June 14, 1974, Ser. No. 479,356
Claims priority, application Germany, June 29, 1973, 2333089
Int. Cl.[2] G05B *1/01*
U.S. Cl. 318—607 **7 Claims**

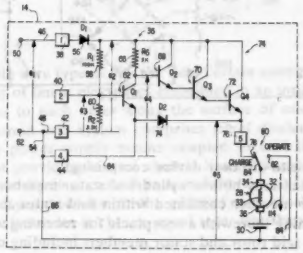


1. An apparatus for the regulation of distance, particularly for the regulation of maintaining substantially constant the distance between a tool and the surface of a workpiece to be processed by means of an electronic sensing element, which is incorporated into an oscillator circuit of an oscillator in such a manner that the distance to the workpiece determines the oscillating frequency, and that the output signals of the oscillator are fed to a discriminator for conversion into direct current output-signals whose polarity and amplitude correspond to the direction and the extent of the regulating deviation, characterized in that the oscillator and the discriminator have tuning circuits in electrical contact between the tool and the workpiece which are variable by means of the output signals, a tool position-correcting element being connected to the tool towards and away from the workpiece, and the oscillator and discriminator being electrically connected to the tool position-correcting element for regulating the position of the tool to be substantially constant from the workpiece.

3,970,912
BATTERY CHARGING CIRCUIT

Philip A. Hoffman, 514 Piccadilly Road, Towson, Md. 21204

Continuation of Ser. No. 392,225, Aug. 28, 1973, abandoned. This application Dec. 26, 1974, Ser. No. 536,490
Int. Cl.[2] H02J *7/10*
U.S. Cl. 320—2 **18 Claims**



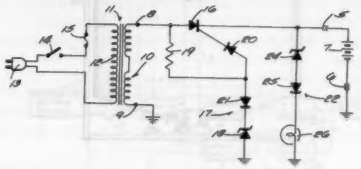
1. A battery operated hand tool comprising a housing, an electrical motor in said housing for operating said tool, means in said housing for coupling said motor to a rechargeable battery, a battery charging circuit in said housing coupled to said motor for charging a battery in said housing in series with an inductance of said motor, said charging circuit comprising a pair of input terminals, a solid state switch connected to said terminals for causing the current from said terminals to flow through said motor, said charging circuit comprising means for automatically varying the charging rate in accordance with the charge on a battery, said solid state switch comprising a transistor, said automatic rate varying means comprising a positive feedback resistor coupling one side of said motor to the emitter-collector circuit of said transistor, and a negative feedback transistor coupling the other side of said motor to the base of said transistor.

6. A battery charging circuit comprising first and second input terminals, a rectifier coupled to said terminals for rectifying an AC input applied to said terminals, a battery, a transistor amplifier coupling said rectifier to said battery whereby rectified current from said terminals flows through said amplifier to said battery, a transistor switch having first and second controlled terminals connected in parallel with said amplifier and battery, said switch having a third control terminal, and means coupling said control terminal to said rectifier whereby said switch is rendered conductive and shunts current around said amplifier and battery when the input voltage exceeds a predetermined value, said switch being rendered non conductive when the input voltage falls below said predetermined value, said switch permitting current flow through said amplifier to said battery when a conventional 60 Hz household outlet electrical source is applied to said input terminals only during those portions of a source cycle when the source voltage is below a predetermined voltage level substantially less than its maximum.

3,970,913
STATE-OF-CHARGE INDICATOR FOR VOLTAGE-REGULATED BATTERY CHARGER

Kenneth J. Heindl, West Allis, Wis., assignor to Briggs & Stratton Corporation, Wauwatosa, Wis.

Filed Dec. 16, 1974, Ser. No. 532,099
Int. Cl.² H02J 7/04
U.S. Cl. 320—48 **4 Claims**



1. In combination with voltage regulated battery charging apparatus of the type having a pair of output terminals to which a storage battery can be connected for charging, a pair of input terminals that provide a source of alternating current having a substantially constant peak voltage, a controlled rectifier which has a gate and which is connected to control flow of current between one of said input terminals and one of said output terminals, and regulating means which comprises a zener diode and which has connections with said gate, with said one input terminal and with the other output terminal, for causing the controlled rectifier to be forwardly conductive when the difference between voltage across the input terminals and voltage across the output terminals exceeds a predetermined value, means for indicating the state of charge of a battery connected with the output terminals, the last mentioned means comprising:

A. a second zener diode;

B. a device capable of producing a perceptible signal upon being electrically energized; and

C. means connecting said device and the second zener diode in series with one another and across the output terminals, with the second zener diode being so connected and having such a zener value that it permits flow of energizing current through said device when voltage across the output terminals is high enough so that said difference remains substantially equal to said predetermined value.

3,970,914
CIRCUIT ARRANGEMENT INCLUDING A NUMBER OF CONVERTERS, IN PARTICULAR DIRECT CONVERTERS, IN Y CONNECTION

Theodor Salzmann; Franz Wesselak, and Wolfgang Timpe, all of Erlangen, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

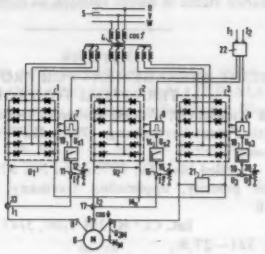
Filed Mar. 24, 1975, Ser. No. 561,279
Claims priority, application Germany, Mar. 29, 1974, 2415398
Int. Cl.² H02M 5/45
U.S. Cl. 321—2 **35 Claims**

1. A circuit arrangement for use with an a.c. voltage network and m-phase symmetrical load, said load having a first neutral point common to said phases, comprising:

a number m of direct converters arranged in an m-phase symmetrical Y configuration having a second neutral point which is common to said converters and not directly connected to said first point, each of said converters being adapted to be connectd to said network and to a different one of said phases of said load;

a number of control units, each of said control units developing an output voltage for controlling a different one of said converters;

means for developing a control voltage which is applied to at least one of said control units and is such that the output voltage of the converter associated with said one unit is caused to be periodic and to include the voltage

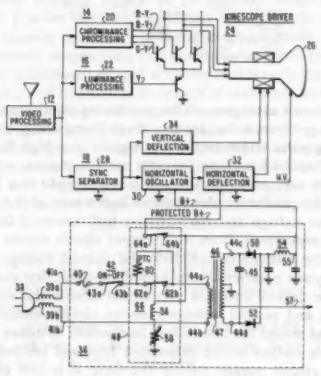


across the phase of the load connected to said associated converter and at least one harmonic of an odd-numbered order divisible by *m*.

3,970,915
FAULT DETECTOR AND INTERRUPT CIRCUIT USEFUL IN A TELEVISION SIGNAL PROCESSING SYSTEM

Adam John Suchko, Elizabeth, Pa., assignor to RCA Corporation, New York, N.Y.

Filed Dec. 30, 1974, Ser. No. 537,548
Int. Cl.² H02M 1/08, 7/00
U.S. Cl. 321—21 **11 Claims**



1. Apparatus for supplying operating voltage to signal processing circuits comprising:

first and second circuit points;

means for coupling said first circuit point to a source of alternating voltage;

direct voltage supplying means coupled to said second circuit point for producing from said alternating voltage a direct operating voltage normally at least equal to a predetermined level; and

switching means for coupling said means for coupling to a source of alternating voltage to said direct voltage supplying means, said switching means including a first circuit path coupled between said first circuit point and said second circuit point and controllable between high and low impedance states, sensing means coupled to said direct voltage supplying means and responsive to the level of said direct operating voltage for varying said first circuit path between said high and low impedance states when said operating voltage is below and at least equal to said predetermined level, respectively, and a second

circuit path coupled between said first circuit point and said second circuit point in parallel relationship to said first circuit path and variable between low and high impedance states in direct relation to current flow therein.

3,970,916

CIRCUIT ARRANGEMENT FOR PRODUCING AN ALTERNATING VOLTAGE

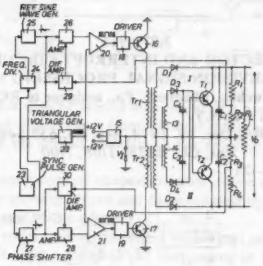
Eckhard Kienscherf, Wedel, Holstein, Germany, assignor to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany

Filed May 16, 1975, Ser. No. 578,253

Claims priority, application Germany, May 16, 1974, 2423718

Int. Cl.² H02M *7/00, 5/45*

U.S. Cl. 321—27 R **10 Claims**



1. A circuit arrangement for producing an alternating output voltage from a d.c. input voltage comprising: means for providing pulse width modulated signals at a high frequency; first and second voltage inverter circuit means, each controlled by said pulse width modulated signals at a high frequency, for producing the positive half waves of the alternating output voltage and the negative half waves of the output voltage respectively from a d.c. input signal; means for connecting the outputs of said first and second voltage inverter circuit means in series across a common load; first and second electronic power switches connected across the outputs of said first and second voltage inverter circuit means respectively; and means for controlling said power switches to short-circuit the output of the respective first and second voltage inverter circuit means during the time it is not producing output energy.

3,970,917

SYSTEM FOR ENERGY STORAGE AND DC TO AC CONVERSION

Richard E. Diggs, P.O. Box 776, Carthage, Mo. 64836

Filed July 16, 1975, Ser. No. 596,302

Int. Cl.² H02K *7/02*; F16F *15/30*

U.S. Cl. 322—4 **11 Claims**

1. An energy storage and conversion system comprising:

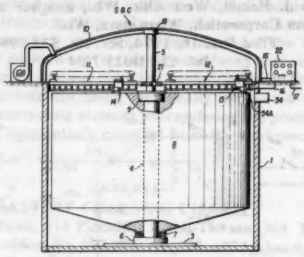
a massive flywheel rotatably mounted within a housing;

drive means coupled to said housing and positioned to selectively engage a surface of said flywheel for supplying power to said flywheel,

driven means coupled to said housing and positioned to selectively engage a surface of said flywheel for withdrawing power from said flywheel,

vertical control means coupled to said drive means and to said driven means for controlling engagement thereof with said flywheel; and,

radial control means coupled to said drive means and to said driven means for adjusting the radial position at which



said drive means and said driven means engage said flywheel.

3,970,918

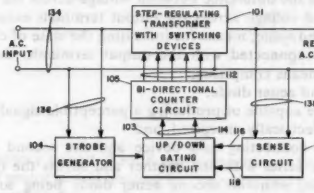
HIGH SPEED, STEP-SWITCHING AC LINE VOLTAGE REGULATOR WITH HALF-CYCLE STEP RESPONSE

Edward Cooper, 2612 Penrose St., San Diego, Calif. 92110

Filed Jan. 13, 1975, Ser. No. 540,647

Int. Cl.² G05F *1/24*

U.S. Cl. 323—6 **6 Claims**



1. An AC line voltage regulator comprising,

switchable means for regulating the line voltage,

sense circuit means for detecting the magnitude of the line voltage and providing an up or down condition signal when the line voltage varies by a given magnitude up or down from a set voltage to be regulated,

zero crossing detector means responsive to the line voltage for detecting and providing output signals at half cycle zero crossings of the line voltage,

gate circuit means responsive to the sense circuit means up or down condition signal and an output signal from said zero crossing detector at each half cycle for providing a corresponding up or down switch signal to said switch means at each half cycle that the line voltage has varied from the given magnitude,

and said gate circuit means including gate control means for inhibiting the providing of an up switch signal after a down switch signal unless the switch signal preceding the down switch signal was a down switch signal and from providing a down switch signal after an up switch signal unless the preceding signal was an up switch signal.

3,970,919

REGULATING DIGITAL POWER SUPPLY

Daryl T. Butcher, La Habra, Calif., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

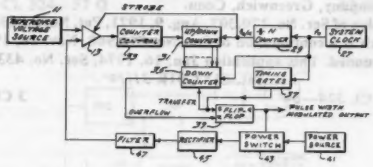
Filed June 19, 1975, Ser. No. 588,735

Int. Cl.² G05F *1/10*

U.S. Cl. 323—19 **3 Claims**

1. A regulated digital power supply system comprising:

a. a clock;
b. a frequency divider fed by the clock;
c. means for comparing a reference signal with an unknown signal upon application of a strobe pulse from the frequency divider;
c. a first means for counting pulses, the first counting means counting the pulses from the frequency divider and being fed by a signal from the comparing means for controlling selectively the direction of the count;



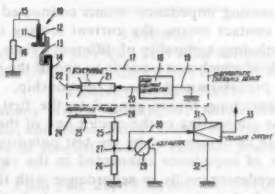
d. a second means for counting pulses, the second counting means counting pulses from the clock in the down direction and being fed by the contents of the first counting means upon a transfer command signal through the clock;
e. a flip-flop being set by the transfer command signal and reset by the second counting means upon reaching an overflow, the output of the flip-flop being the regulated power supply;
f. a source of power; and
g. a power switch interposed between the source of power and the comparing means and activated by the flip-flop for controlling the magnitude of the unknown signal.

3,970,920

MEASURING ARRANGEMENT FOR AN APPARATUS FOR ELECTROSTATIC COATING OF GROUNDED OBJECTS FOR MEASURING THE GROUND RESISTENCE

Franz Braun, Staad, Switzerland, assignor to Gema AG Apparatebau, St. Gall, Switzerland

Continuation of Ser. No. 342,857, March 19, 1973, abandoned. This application Mar. 24, 1975, Ser. No. 561,413
Claims priority, application Switzerland, Mar. 22, 1972, 4217/72
Int. Cl.² G01R 5/28; G01N 27/00
U.S. Cl. 324—32 **10 Claims**



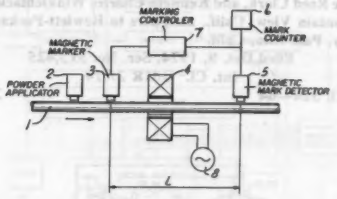
1. Means for measuring the ground resistance of successive grounded objects which are to be electrostatically coated in a coating apparatus, said coating apparatus including conveying means for moving said objects over a defined conveying path, influencing means proximate to said path for continuously influencing the electrical potential of said objects without contacting the same, and a power source for energizing said influencing means, said measuring means comprising monitoring means for delivering and early warning signal in response to a gradual increase in ground resistance of the objects before the potential of the objects has reached a predetermined value below the breakdown value.

3,970,921

METHOD AND APPARATUS FOR MEASURING THE LENGTH OF LONG LENGTH MATERIALS

Hiroshi Ito, Osaka, Japan, assignor to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Feb. 14, 1975, Ser. No. 550,152
Int. Cl.² G01R 33/12
U.S. Cl. 324—34 L **6 Claims**



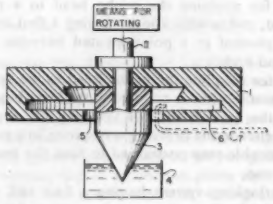
1. An apparatus for measuring the length of a longitudinally traveling long length material containing a magnetic constituent comprising a magnetic powder application device to apply a magnetic powder layer to the traveling long length material, a magnetic marking device to periodically magnetize said magnetic powder layer and inevitably said magnetic constituent and thereby produce a periodic magnetic mark, an alternating current magnetizing coil positioned to demagnetize the magnetic constituent of said material as it travels through the field of said coil to shorten the length of said mark and thereby more sharply define it, a magnetic mark detector positioned a predetermined length from said magnetic marking device to detect said magnetic marks as they pass by said detector, and counting means to count the detected marks and thereby measure said long length material by counting the number of said predetermined lengths which pass said detector.

3,970,922

HALL-VOLTAGE DEVICE

Ferdinand Hubert Franciscus Gerardus Spierings, Wageningen, Netherlands

Filed Sept. 9, 1974, Ser. No. 504,658
Claims priority, application Netherlands, Sept. 13, 1973, 7312638; Sept. 13, 1973, 7312639
Int. Cl.² G01R 33/06; G21D 7/02
U.S. Cl. 324—45 **5 Claims**



1. In a Hall voltage device of the type having a magnetic system for defining and generating a magnetic field in an air gap, a cylindrical box mounted between and substantially parallel to the planar boundaries of the air gap defined by the magnetic system, the box having an interior cavity arranged to

contain a fluid having charged particles distributed therein, the box including electrodes located adjacent to its axis and the outer periphery of the cavity, respectively, and adapted to cooperate with said fluid, and means for imparting to the box a rotational motion about its axis, said axis substantially coinciding with the central axis of said magnetic circuit, the improvement comprising

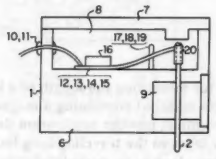
means in an end face of said box defining an aperture centered on said axis for introducing said fluid into said box while said box is rotating.

3,970,923

APPARATUS FOR MEASURING SHEET RESISTIVITY OF SEMICONDUCTOR MATERIALS AND DIFFUSED LAYERS

George Reed Clark, and Kenneth Charles Winkleblack, both of Mountain View, Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Oct. 9, 1974, Ser. No. 513,425
Int. Cl.[2] G01R 27/14
U.S. Cl. 324—64 3 Claims



1. Apparatus for measuring sheet resistivity of semiconductor materials and diffused layers comprising:

pneumatically operated probe means for applying current to a material to be tested and for detecting a voltage created in the material to be tested by the current applied thereto, said probe means comprising a probe head having a body structure with a main pressure cavity, having first and second sealed inlets and a plurality of probe orifices and a plurality of probe pins fitted to the plurality of probe orifices and positioned therein for passing therethrough in response to pressure being applied to the main pressure cavity;

a current source having high output impedance for producing a selected value of current at a range of voltages;

self-zeroing voltage amplification means for amplifying the voltage detected by the probe means and producing an output in response to said voltage;

means coupled to the first sealed inlet for connecting the current source and the self-zeroing amplification means to the plurality of probe pins;

means coupled to the second sealed inlet for applying pressure to the main pressure cavity; and

means for applying the probe head to a material to be tested, comprising a lever having a first and second end and pivoted at a point located between said first and second ends,

means for coupling the probe head to the second end,

a pneumatic cylinder coupled to the lever between the point and the second end for lowering the second end with reference to the first end in response to a control signal,

an adjustable stop positioned to limit the movement of the first end,

an interlocking system having a first and second microswitch, the first microswitch positioned to actuate when the first end communicates with the adjustable stop and the second microswitch positioned to actuate in response to a material to be tested being in a sample receiving position, and

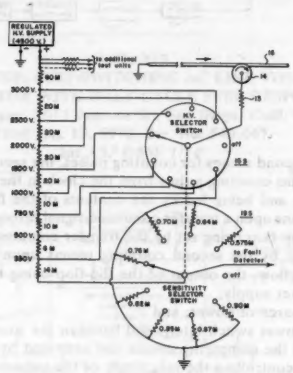
control means coupled to the first and second microswitches for producing a control signal in response to the probe head being in pin contact range of a material to be tested and the material being in a sample receiving position.

3,970,924

APPARATUS FOR DETECTING FAULTS IN MAGNET WIRE INSULATION WITHOUT THERMALLY DAMAGING THE INSULATION AND WHICH DOES NOT RESPOND TO IMPEDANCE INDICATIONS ABOVE A PREDETERMINED THRESHOLD VALUE

Wesley William Pendleton, and Robert Clifton Thompson, both of Muskegon, Mich., assignors to Anaconda Wire & Cable Company, Greenwich, Conn.

Division of Ser. No. 170,307, Aug. 9, 1971, Pat. No. 3,823,370, which is a continuation of Ser. No. 876,968, Nov. 14, 1969, abandoned. This application Jan. 16, 1974, Ser. No. 433,782
Int. Cl.[2] G01R 31/14
U.S. Cl. 324—54 3 Claims



1. Apparatus for continuously testing continuity of the insulation coating on a moving insulated wire conductor, said apparatus comprising:

a. contact means for applying one of a plurality of D-C high voltage test potentials between the exterior surface of the insulation coating and the interior conductor;

b. first switching means for selecting any one of the test potentials to be applied;

c. a current limiting impedance connected in circuit with the contact means for limiting the current through a fault to a value such that the product of the D-C high voltage and the fault current does not exceed about 150 milliwatts;

d. current sensing impedance means connected in circuit with the contact means, the current sensing impedance means including a plurality of different values of impedance each of which corresponds to one of the test potentials in a predetermined chosen relationship;

e. second switching means ganged to the first switching means for connecting in the circuit one of the values of impedance as determined by the test potential selected, the value of impedance connected in the circuit being chosen predeterminedly in accordance with the test potential such that the apparatus responds to the highest resistance pin-hole fault desired to be detected for the particular thickness of insulation coating under test, each of which resistance pin-hole faults are different for different thicknesses of insulation coating;

f. threshold amplifying means for amplifying pulses of current flowing through said current sensing impedance means and passing only pulses above a predetermined threshold level; and,

g. fault-rate counter means for counting the number of fault current pulses for each successive predetermined incremental length of insulated wire.

3,970,925

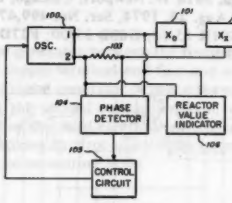
DIRECT READING REACTANCE METER

Samuel Anderson Procter, Minneapolis, and Robert Dewitt Younger, Bloomington, both of Minn., assignors to Control Data Corporation, Minneapolis, Minn.

Continuation-in-part of Ser. No. 468,946, May 10, 1974, abandoned. This application Apr. 28, 1975, Ser. No. 572,571

Int. Cl.² G01R 27/00

U.S. Cl. 324—57 Q 12 Claims



11. Apparatus for generating a signal indicative of the unknown value of a first reactive element having first and second terminals, whose value is within a predetermined range, comprising:

a. an oscillator supplying across first and second output terminals the first of which is connected to the first terminal of the first circuit element, an approximately sinusoidal voltage output signal whose frequency varies within a predetermined range as a function of an input signal, and is the required unknown element value indication;

b. a second reactive circuit element connected to the first reactive element to form therewith a circuit having a resonant frequency and which receives the oscillator output;

c. means receiving the oscillator current for producing a signal specifying phase of the oscillator current;

d. a phase detector receiving the oscillator current phase signal and the oscillator voltage and producing a signal indicating the phase relationship between oscillator voltage and current; and

e. control means receiving the phase detector output signal for supplying the input signal to the oscillator and for varying the input signal to the oscillator to shift the oscillator output frequency so as to drive the phase shift between the oscillator output voltage and current progressively toward a predetermined value.

3,970,926

METHOD AND APPARATUS FOR MEASURING THE GROUP DELAY CHARACTERISTICS OF A TRANSMISSION PATH

Peter Anthony Rigby, Linlithgow; Ralph Hodgson, Easter Pitcorthie, and David Hubert Guest, Balerno, all of Scotland, assignors to Hewlett-Packard Limited, South Queensferry, Scotland

Filed Feb. 21, 1975, Ser. No. 551,819

Claims priority, application United Kingdom, June 3, 1974, 24572/74

Int. Cl.² G01R 27/00

U.S. Cl. 324—57 R 23 Claims

1. A method of measuring group delay characteristics of a transmission path, comprising the steps of:

a. feeding a test signal to the input of a transmission path, the test signal including a carrier with a frequency that is interchanged periodically between a measuring frequency and a reference frequency, the carrier being amplitude modulated by a split frequency during both carrier periods;

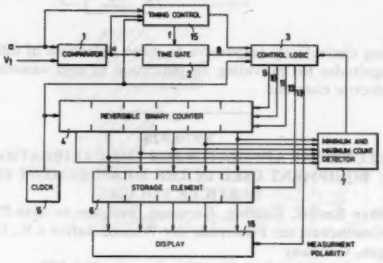
b. receiving the test signal from the output of the transmission path;

c. demodulating the received test signal;

d. sensing in the demodulated test signal a plurality of specified points, said specified points including:

a first specified point in any period of a first of the reference and measuring carrier periods of the demodulated test signal;

a second specified point in a selected period of a second of the reference and measuring carrier periods of the demodulated test signal;



a third specified point in a selected period of the second of the reference and measuring carrier periods of the demodulated test signal; and

a fourth specified point in a selected period of the first of the reference and measuring carrier periods of the demodulated test signal;

e. measuring a first time interval between the first and second specified points;

f. measuring a second time interval between the third and fourth specified points; and

g. deriving said group delay characteristics from the measured first and second time intervals, the first and second time intervals being digitally measured by a pulse counter.

3,970,927

METHOD AND APPARATUS INCLUDING A SENSING HEAD WITH A PAIR OF STRIP TRANSMISSION LINES FOR DETECTING METALLIC OBJECTS

Peter Howard Ladbrooke, Portsmouth; Arthur Timothy Torlesse, Chichester, and John David Newman, Titchfield, all of England, assignors to Plessey Handel und Investments A.G., Switzerland

Filed Dec. 2, 1974, Ser. No. 528,995

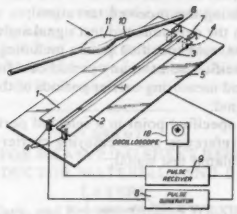
Claims priority, application United Kingdom, Nov. 30, 1973, 55712/73

Int. Cl.² G01R 31/00; G01V 3/08

U.S. Cl. 324—67 10 Claims

1. Apparatus for the detection of local variations in the dielectric constant of a structure, which comprises: a sensing head arranged to be moved along a surface of the structure and including a single, electrically conducting ground plane, a first and second electrically conductive strip supported on one side of said ground plane, said strips being disposed in spaced-apart relationship in a common plane and in equally spaced-apart, parallel relationship with said ground plane, each of said strips forming therewith a transmission line, said strips being spaced from each other to provide an electric potential difference between said strips for producing an electric field of significant intensity substantially beyond the plane of said strips to intersect the surface of the structure along which said sensing head is moved, means for generating and applying to one end of said first strip time-spaced pulses

of electric potential relative to said ground plane and potential-detector means interposed between the adjacent end of said second strip and the ground plane, said detector means



being distinctively responsive to pulse potentials of different magnitudes for providing an indication of said variations in dielectric constant.

3,970,928

ELECTRICAL APPARATUS FOR THE CALIBRATION OF EQUIPMENT USED IN THE MEASUREMENT OF PARTICLE VOLUME

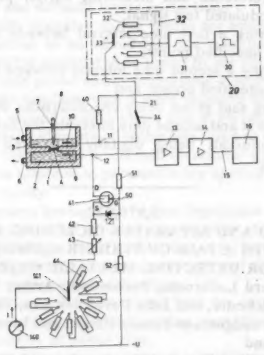
Volker Kachel, Gauting, Germany, assignor to Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V., Gottingen, Germany

Filed Dec. 17, 1974, Ser. No. 533,658

Claims priority, application Germany, June 11, 1974, 2428082

Int. Cl.² G01N *27/04*

U.S. Cl. 324—71 CP **6 Claims**



1. In an electrical apparatus for calibration of measurement equipment for measuring the volume of particles, which includes two chambers filled with liquid electrolyte which communicate through a measurement aperture, and which further includes two electrodes located on opposite sides of the aperture, by which a current can be passed through the aperture, and which further includes means for introducing particles into the first of said two chambers, said particles passing through said measurement aperture, thereby generating voltage pulses across the electrodes, said apparatus further including a processing and analysis unit for processing and analyzing said voltage pulses, and including means for producing calibration voltage pulses which are used by said processing and analyzing unit to associate a certain particle volume with a certain voltage pulse amplitude, the improvement comprising:

a resistor which is positioned in the electrical path in series with said measurement aperture, said resistor having an ohmic resistance which is small with respect to the ohmic resistance of said measurement aperture; and

a calibration pulse generator, for producing calibration voltage pulses of adjustable amplitude, said calibration voltage pulses being introduced into the electrical path formed between said resistor and said measurement aperture, thereby applying the calibration voltage pulses essentially across the electrodes, said calibration pulses also being fed to the processing and analyzing unit, in which a numerical volume derived by calculation and theory from said calibration voltage pulses is associated with the voltage pulses received by said processing and analysis unit.

3,970,929

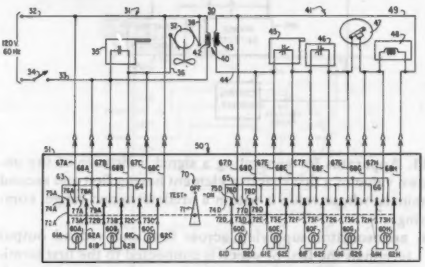
TEST APPARATUS FOR USE WITH A HEATING SYSTEM

Eugene W. Borucki, 8115 N. Greenwood, Niles, Ill. 60648, and Peter P. Zaloga, 5818 W. Newport, Chicago, Ill. 60634

Filed Aug. 22, 1974, Ser. No. 499,471

Int. Cl.² G01R *15/12*; G08B *25/00*; F27D *21/00*

U.S. Cl. 324—73 R **10 Claims**



1. Test apparatus for use in connection with a heating system including a plurality of control elements connected to an associated source of AC electric power, said test apparatus comprising only a plurality of indicator means equal in number to and corresponding respectively to the control elements, and passive switch means connected to each of said indicator means and to the associated source of AC electric power and adapted for connection to said heating system, said switch means having an indicator-checking condition disconnecting each of said indicator means from the control elements and interconnecting each of said indicator means and the associated source for simultaneously indicating the condition of each of said indicator means, said switch means having an analyzing condition interconnecting said indicator means respectively in parallel with the corresponding control elements for simultaneously indicating the condition of each of said control elements, said switch means being selectively operable between the indicator-checking and analyzing conditions thereof without consumption of electricl power.

3,970,930

CURRENT METER

Johannes Volkert Vermolen, Beekbergen, Netherlands, assignor to U.S. Philips Corporation, N.Y., N.Y.

Filed Sept. 17, 1974, Ser. No. 506,783

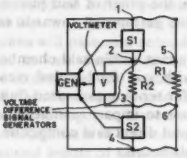
Claims priority, application Netherlands, Sept. 22, 1973, 7313095

Int. Cl.² G01R *17/02, 1/36*

U.S. Cl. 324—98 **10 Claims**

1. A device for monitoring a measuring circuit connected to a load to be supplied with an electric current from a source of electric energy comprising, a first supply lead connecting a first end of said load to a first supply terminal of the energy source, a first measuring lead connecting said first end of the load to a first measuring terminal of an electric measuring device, means including a second supply lead connecting a second end of the load to a second supply terminal of the energy source and by a second measuring lead to a second

measuring terminal of the measuring device, respectively, a bridge resistor connected between the first and the second measuring terminal, the resistance value of said bridge resistor being high with respect to the resistance of the load, first and second voltage difference signal generators each having three electrodes, means connecting first and second electrodes of

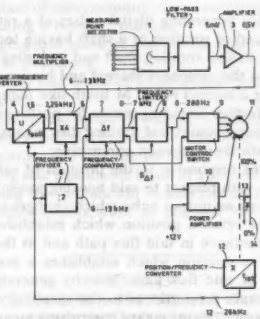


the first signal generator between the first measuring terminal and the first supply terminal and first and second electrodes of the second signal generator between the second measuring terminal and the second supply terminal, respectively, and means including the third electrode of one of said signal generators for deriving an error signal upon interruption of any of said supply and measuring leads.

3,970,931
APPARATUS FOR RECORDING ELECTRICAL QUANTITIES

Ivan Novak, Kassel, Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Filed July 5, 1974, Ser. No. 486,221
Claims priority, application Germany, June 30, 1973, 2333413
Int. Cl.² G01R *17/06, 19/26*
U.S. Cl. 324—99 R **16 Claims**

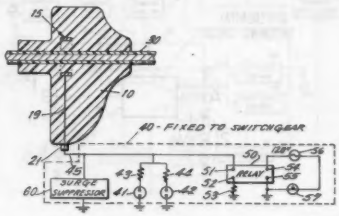


1. Apparatus for indicating the value of an electric quantity comprising, means for producing a signal voltage determined by the electric quantity, means responsive to said signal voltage for converting the signal voltage into a first repetitive signal having a first frequency that is proportional to the amplitude of the electric quantity, a comparator having a first input coupled to the output of the voltage-frequency converting means, a frequency limiter having an input coupled to the output of the comparator, a servo stepping motor having a rotatable shaft connected to an indicator member, control switching means coupled between the output of the frequency limiter and an input of the stepping motor for controlling the rotation direction and speed of the motor, means responsive to the shaft position for converting the shaft position into a second repetitive signal having a second frequency that is determined by the shaft position, and mens for coupling said second signal to a second input of the comparator in a sense which tends to compensate the first signal whereby the comparator produces a difference frequency signal at the comparator output which approaches a zero value when the motor shaft corresponds to the value of the electric quantity.

3,970,932
HOT LINE DETECTION SYSTEM FOR HIGH VOLTAGE SWITCHGEAR

Horace A. Harvey, Trevose, Pa., assignor to I-T-E Imperial Corporation, Spring House, Pa.

Filed Sept. 3, 1974, Ser. No. 502,546
Int. Cl.² G01R *19/16*
U.S. Cl. 324—133 **3 Claims**



1. A hot line detector for connection to high voltage lines comprising, in combination:

a housing formed entirely of an insulating material having a substantially invarient dielectric constant and having an opening therethrough for receiving a continuous length of energizable conductor, said housing having an annular chamber formed therein concentric with said opening;

a conductive coating formed on the interior surface of said chamber;

a conductive foil surrounding and in contact with said coating for defining a single cylindrical conductive electrode embedded in said insulation housing and surrounding said opening, said cylindrical conductive electrode being the sole electrical conductive device within said insulation housing;

a mass of insulation potting material filling said annular chamber to encapsulate said conductive electrode therein;

a lead wire leading through said insulation housing and being exposed at one end at the exterior surface of said insulation housing for connection to an exterior circuit, said lead wire being connected at its other end to said cylindrical conductive electrode;

indicating circuit means at a location remote from said housing for indicating the presence of a conductor at a voltage in excess of a given voltage in said insulation housing by the capacitive coupling between said cylindrical conductive electrode and a conductor which passes through said cylindrical conductive electrode; and

remote connection means permanently connecting said one end of said lead wire to said remote indicating circuit means.

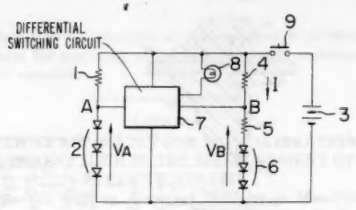
3,970,933
DEVICE FOR CHECKING A D.C. SOURCE VOLTAGE RELATIVE TO A PREDETERMINED VALUE

Ichiro Hamaguchi, Yokohama, and Kenji Toyoda, Kawasaki, both of Japan, assignors to Nippon Kogaku K.K., Tokyo, Japan

Filed Jan. 20, 1975, Ser. No. 542,542
Int. Cl.² G01R *19/16*; G01N *27/46*
U.S. Cl. 324—133 **10 Claims**

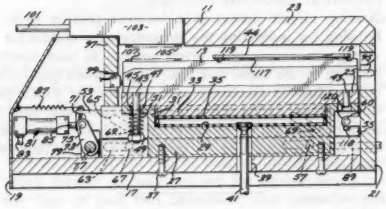
1. A Device for checking and indicating the voltage of a D.C. source relative to a predetermined value, comprising:

a. a bridge circuit including:
a first circuit comprising a first resistor;
a second circuit comprising a first diode means and connected to said first circuit;
a third circuit comprising a second resistor and connected to said first circuit, the junction between said third and first circuits being connected to one of the terminals of said D.C. source; and
a fourth circuit comprising a serial connection of second diode means and a third resistor, one end of said fourth circuit being connected to said third circuit and the other end being connected to said second circuit, the junction between said fourth and second circuits being connected to the other terminal of said D.C. source, the resistance value of said third resistor being sufficiently great so that the differential voltage between the junction of said first and second circuits and the junction of said third and fourth circuits varies in dependence on the voltage of said D.C. source;



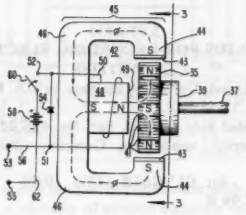
b. a differential switching circuit connected between the junction between said first and second circuits and the junction between said third and fourth circuits to change its condition in accordance with the differential voltage between said two junctions, said differential switching circuit having an output terminal for representing the condition thereof; and
c. an indicator element connected to said output terminal for indicating the condition of said differential switching circuit to provide an indication of the voltage of said D.C. source relative to said predetermined value.

3,970,934
PRINTED CIRCUIT BOARD TESTING MEANS
Akin Aksu, 739 E. 223rd St., Carson, Calif. 90745
Filed Aug. 12, 1974, Ser. No. 496,385
Int. Cl.[2] G01R *1/06, 31/02*
U.S. Cl. 324—158 F **25 Claims**



1. A circuit board test fixture which comprises:
a housing;
a pair of generally opposed and parallel platen members carried therein with at least one of said platen members movably mounted in said housing with peripheral flange means and an integral central boss carried by said member, said central boss received within a coextensive, central cavity formed by the facing interior wall of said housing and spaced apart from the bottom of said central cavity to define a central chamber therein;
guide rail means on opposite sides of the movable platen member and connected by guide pins at opposite ends thereof between said movable platen member and housing to maintain said platen members in parallel alignment during movement of said movable platen member;
means for supporting a circuit board against one of said platen members;
means for supporting on the other of said platen members pressured contact units juxtaposed towards said circuit board;
fluid-sealed expansion means within said chamber; and
means communicting with said fluid-sealed means exteriorly of said chamber for sending pressured fluid into said sealed expansion means to impart relative movement to said platen members and direct said contact units against circuitry of said circuit board.

3,970,935
WIDE-RANGE DIGITAL RELUCTANCE TACHOMETER
Jack Beery, Farmington, and Daniel A. Wisner, Milan, both of Mich., assignors to Burroughs Corporation, Detroit, Mich.
Filed Feb. 18, 1975, Ser. No. 550,596
Int. Cl.[2] G01P *3/48;* **H03K** *13/20*
U.S. Cl. 324—166 **10 Claims**



1. A system for generating digital pulses at a rate proportional to the speed of rotation of a shaft having toothed disk means attached to said rotating shaft and including a first set of M teeth about the periphery thereof and housing assembly means including a second set of M tooth-like members, said housing means further including means for positioning said M tooth-like members around said toothed disk means for establishing a flux path therebetween comprising:
detector means responsive to the position of said toothed disk means with respect to said housing assembly means for generating an output pulse which changes state at the approximate relative position which establishes a minimum of reluctance in said flux path and at the approximate relative position which establishes a maximum of reluctance in said flux path, thereby generating digital pulses at a rate proportional to the speed of rotation of said shaft, said detector means comprising means coupled to said housing assembly means and about at least a portion of said flux path for sensing increases and decreases in the reluctance of said flux path, said reluctance sensing means including an electrical coil wrapped around at least a portion of said flux path for generating an electrical current which increases and decreases with the increases and decreases of the reluctance of said flux path and an electrical current-sensing resistor means coupled between the opposite end of said electrical coil for sensing said generated electrical current; and
means responsive to said reluctance sensing means for generating a first output signal when said reluctance has ceased to increase and begun to decrease and for generating a second output signal when said reluctance has ceased to decrease and begun to increase, said means responsive to said reluctance sensing means including differential voltage comparator means having a first and second input and a comparator output, and means cou-

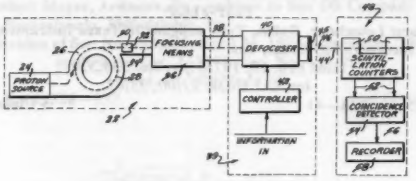
pled across said current-sensing resistive means and responsive thereto such that the output of said comparator means will pass said first output signal when the current flowing in said current-sensing resistor means has ceased to increase and begun to decrease which is indicative of the reluctance of said flux path having ceased to increase and begun to decrease so as to establish a differential voltage ratio of a first polarity between said first and second inputs and such that the output of said comparator means will pass said second signal in response to the current in said current-sensing resistor means having ceased to decrease and begun to increase which is indicative of the reluctance of said flux path having ceased to decrease and begun to increase so as to establish a differential voltage ratio of a second polarity between said first and second inputs of said comparator means.

3,970,936

TELECOMMUNICATION USING MUON BEAMS

Richard C. Arnold, Chicago, Ill., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed May 29, 1973, Ser. No. 364,397
Int. Cl.² H04B 9/00
U.S. Cl. 325—26 **3 Claims**



1. A method of telecommunication comprising the steps of:
a. generating a beam of protons;
b. impinging said beam of protons on a target to generate a beam of pi mesons;
c. permitting said beam of pi mesons to decay into a beam of muons;
d. defocusing said beam of muons at a modulating rate to generate a modulated beam of muons at a first location;
e. transmitting said modulated beam;
f. receiving said modulated beam at a second location; and
g. detecting the modulation in said modulated beam,
whereby telecommunication is effected between said two locations.

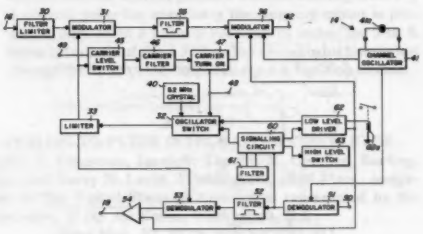
3,970,937

MODEM FOR A SUPPRESSED CARRIER COMMUNICATIONS SYSTEM

Wayne J. Bates, Des Plaines; Walter L. Berenson, Palatine; William H. Euchner, Jr., Arlington Heights; James H. Grigg, Chicago; Morton Stern, Skokie, and Ronald W. Taylor, Arlington Heights, all of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 19, 1974, Ser. No. 534,388
Int. Cl.² H04B 1/68
U.S. Cl. 325—49 **6 Claims**

1. In a suppressed carrier, communications system including at least two, spaced apart, transmitter-receivers wherein a portion of the carrier is transmitted for use as a synchronizing signal, a modem comprising:
a. a transmitter portion including a first modulator connected to receive audio frequency signals and supplying an output signal to a second modulator through a bandpass filter, the second modulator supplying an output signal at a unique channel frequency to one of the transmitters of the communications system;
b. a receiver portion including a first demodulator connected to receive signals from the receiver of the communications system associated with the one transmitter and supplying an output signal to a second demodulator through a bandpass filter, the second demodulator providing audio frequency signals at the output thereof;
c. carrier frequency supplying means connected to the first modulator of said transmitter portion and the second demodulator of said receiver portion;
d. a crystal controlled channel oscillator connected to the second modulator of said transmitter portion and the first demodulator of said receiver portion, said channel oscillator having a variable frequency controlling means connected thereto including a replaceable plug-in crystal for controlling the channel frequency at which the modem operates;
e. means for introducing a small portion of the carrier from the carrier frequency supplying means to the second modulator of the transmitter portion for synchronization of any communicating modems; and
f. switch means connected to said carrier introducing means for providing first and second levels of carrier signal with the first level being substantially lower in amplitude than the second level to perform signalling functions.

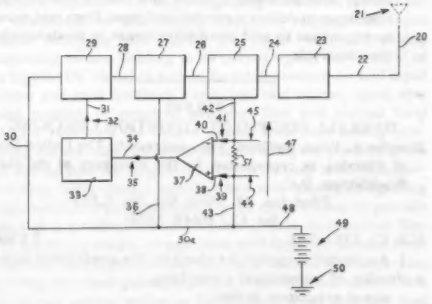


3,970,938

METHOD AND APPARATUS FOR DETERMINING MOTION AND SPEED

Hans D. Sylten, Fort Lauderdale, Fla., assignor to Jack N. Holcomb, Fort Lauderdale, Fla.

Filed June 24, 1974, Ser. No. 482,481
Int. Cl.² G01R 33/00
U.S. Cl. 325—117 **6 Claims**



1. Apparatus for detecting motion of a transmitter comprising; a transmitter; an antenna connected to such transmitter and depending therefrom; means to sense the load impedance of said antenna; means connected to the transmitter, controlled by said means sensing said load impedance, which

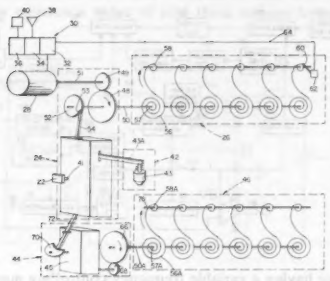
means affects a voltage controlled oscillator so as to modulate the transmitter.

3,970,939

SIGNAL GENERATING AND TRANSMITTING APPARATUS

John G. Willis, Wakefield, Mass., assignor to Solid State Technology, Inc., Wilmington, Mass.

Filed Oct. 22, 1974, Ser. No. 516,973
Int. Cl.² H04B *1/04*
U.S. Cl. 325—185 **13 Claims**



1. A self-contained alarm signal apparatus comprising
an electrical signal generator,
a transmitter connected to receive the output of said generator,
a first source of mechanical energy, including first spring means and manual winding means therefor,
a second source of mechanical energy, including second spring means and manual winding means therefor
connector means for intermittently applying energy from said first and second sources of mechanical energy to said generator for the production of an electrical signal, and
first and second input devices for delivering mechanical inputs from said first and second sources of mechanical energy to said connector means, each said mechanical input device being operative to cause said connector means to apply mechanical energy to said generator,
said first input device being connected to said first source of mechanical energy, and
said second input device being automatically operable and being connected to said second source of mechanical energy and including a timer and means responsive to said timer to deliver a mechanical input from said second spring means to said connector means at predetermined time intervals.

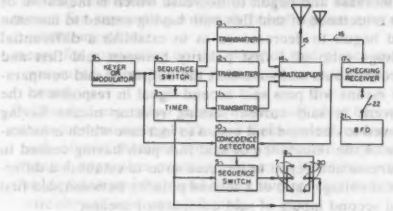
3,970,940

OVERALL EQUIPMENT CONDITION CHECKING

Douglas A. Venn, Suitland, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 28, 1960, Ser. No. 5,317
Int. Cl.² H04B *17/00*
U.S. Cl. 325—363 **2 Claims**

1. An electrical system for checking the operational state of a plurality of transmitters comprising,
a. signal generating means,
b. signal applying means for sequentially applying the output of said signal generating means to said plurality of transmitters,
c. means for radiating the output of each of said transmitters,
d. means for receiving the radiated energy,
e. a coincidence detector,
f. means for connecting said coincidence detector between said signal generating means and said receiving means, and



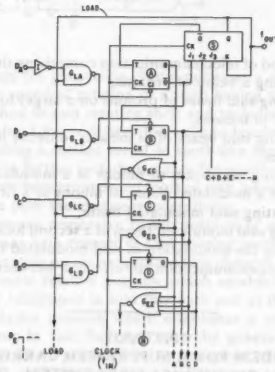
g. an alarm circuit connected to said coincidence detector, whereby said alarm circuit will be actuated in the absence of a coincidence condition in said detector between the signal received from said generating means and the signal from said receiving means.

3,970,941

FAST PROGRAMMABLE DIVIDER WITH A NEW 5-GATE FLIP-FLOP

Horst Leuschner, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Feb. 18, 1975, Ser. No. 550,320
Int. Cl.² H03K *21/00, 23/02*
U.S. Cl. 328—41 **5 Claims**



1. A programmable divider for dividing an input pulse train signal by any whole number divisor represented by an N-bit binary number where N is an integer comprising: an output terminal, a pulse train input terminal, and a divisor-bit input terminal for each bit of said N-bit binary number, an output JK flip-flop, a T flip-flop stage for each bit of said N-bit binary number, means responsive to a load signal to apply the complement signal of the bit of said N-bit binary number appearing at the least significant bit input terminal of said divisor bit input terminals to the clear input of the T flip-flop stage for the least significant bit of said binary number, means responsive to said load signal to apply the bit signal appearing at each of the remaining divisor bit input terminals to the preset terminal of a respective one of each of the others of said T flip-flop stages, means to apply a signal appearing at said pulse train input terminal to the clock terminal of each of said flip-flops,

means applying the Q output of said output flip-flop to said output terminal, to the K input of said output flip-flop and as the load signal to each of said means responsive to a load signal, means applying the Q output of said output flip-flop to the T input of said least significant bit flip-flop, means applying the Q output of said least significant bit flip-flop to a J input of said output flip-flop and to the T input of the flip-flop receiving signal from the divisor bit input terminal receiving the second least significant bit of said N-bit binary number, means associated with each T flip-flop stage other than said least significant bit flip-flop stage and said second least significant bit flip-flop stage to receive the Q outputs from all T flip-flop stages associated with less significant bits of said N-bit binary number than said associated T flip-flop stage and to apply to the T input of said associated flip-flop stage the NOR function of said received Q outputs, means applying the Q output of said second least significant bit T flip-flop stage to a second J input of said output flip-flop and means receiving the Q outputs of all of said T flip-flop stages other than said least significant bit and said second least significant bit T flip-flops and applying the NOR function signal thereof to the remaining J inputs of said output flip-flop.

3,970,942

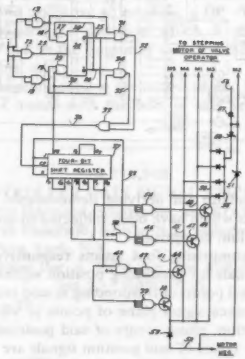
ANTI-HUNTING SYSTEM FOR VALVE OPERATOR CIRCUIT

Robert Mayer, Ardmore, Pa., assignor to Sun Oil Company of Pennsylvania, Philadelphia, Pa.

Division of Ser. No. 462,837, April 22, 1974, abandoned. This application Jan. 2, 1975, Ser. No. 537,994

Int. Cl.² H03D *13/00*

U.S. Cl. 328—133 **6 Claims**



1. A pulse rate comparison system for comparing two input pulse trains to control a stepping motor and having means for preventing hunting action, and comprising:

a. a J-K flip-flop circuit, said J-K flip-flop comprising,

i. a flip-flop circuit with a set terminal, a reset terminal and a clock terminal as input terminals and Q and Q output terminals,

ii. a first AND gate having one input terminal designated as the J input terminal and a second input terminal connected to the Q output terminal, the output of said first AND gate being connected to the set input terminal of the flip-flop circuit, and

iii. a second AND gate having one input terminal designated as the K input terminal and a second input terminal connected to the Q output terminal, the output of said second AND gate being connected to the reset input terminal of the flip-flop circuit;

b. means for applying one of two input pulse trains to be compared to the J input terminal of the J-K flip-flop circuit;

c. means for applying the remaining or second pulse train to the K input terminal of the J-K flip-flop circuit;

d. means for combining the two input pulse trains to form a third pulse train having an absolute time relationship with the input pulse trains;

e. means for applying the third pulse train to the clock pulse terminal of the J-K flip-flop circuit; and

f. means, responsive to the state of the input and output terminals of the J-K flip-flop circuit, for controlling the energizing of the stepping motor so that the motor is moved into the correct position without hunting, whereby a control pulse for energizing the stepping motor is produced only when a pulse is received by either the J or K input terminals of the J-K flip-flop circuit which does not change the state of the output of the J-K flip-flop circuit.

3,970,943

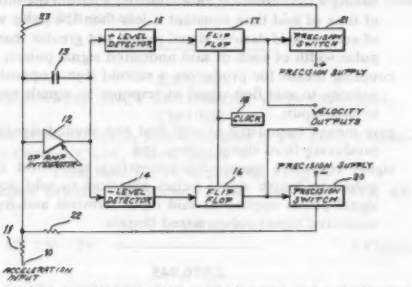
ANALOG-TO-PULSE INTEGRATING CONVERTER

Everett E. Chapman, Ipswich; Thomas H. Crocker, Burlington, and Barry N. Levitt, Framingham, all of Mass., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Mar. 27, 1975, Ser. No. 563,011

Int. Cl.² H03K *1/16*

U.S. Cl. 328—151 **2 Claims**



1. An analog-to-pulse integrating converter being comprised of analog means to integrate a bipolar DC signal, a feedback capacitor for said integrating means, an input resistor connected to said analog integrator means, said input resistor receiving said bipolar DC signal with said analog integrating means yielding as an output signal, the integral of the bipolar DC signal at a scale factor dependent on said input resistor and said feedback capacitor, said output signal also being positive or negative swinging, first and second level detector receiving the output signals from said analog integrating means, said first level detector being for positive levels and the second for negative levels, with said level detectors providing pulse output signals when said analog integrating means reaches a predetermined level, clock means to provide pulses at a predetermined frequency, first and second flip-flops receiving output pulses from said first and second level detectors, respectively, said first and second flip-flops also receiving the clock pulses to permit clocked synchronized first and second output pulses to be obtained from said first and second flip-flops, respectively, first and second positive and negative predetermined reference voltage sources normally disconnected, and switching means to connect said positive and negative reference voltage sources to said integrating means upon receiving said clocked synchronized first and second output pulses, respectively.

3,970,944

PULSE SUPPRESSING CIRCUIT ARRANGEMENTS AND EQUIPMENT INCORPORATING THE SAME

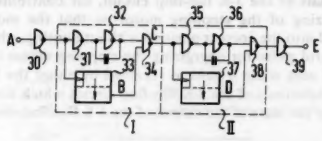
Josef Huellwegen, Altenbeken, Germany, assignor to Nixdorf Computer AG, Paderborn, Germany

Filed Feb. 27, 1975, Ser. No. 553,587

Claims priority, application Germany, Mar. 7, 1974, 2410957

Int. Cl.² H03B *1/04*; H03K *5/01*; H04B *15/00*

U.S. Cl. 328—162 12 Claims



1. In a pulse suppression circuit arrangement for use in a data transmission system for suppressing undesired signal pulses having a duration sufficient to interrupt a desired signal pulse transmission, which desired signal transmission has a duration at least equal to a first time interval, said pulse suppression circuit having an input terminal and an output terminal, said desired and undesired signals being applied to said input terminal, the improvement comprising:

triggerable pulse generator means for producing a first signal in response to pulse edges of one polarity of said desired signal, said triggerable pulse generator means having a time constant characteristic wherein the interval of time of said time constant is less than the pulse width of each of said desired signal pulses and greater than the pulse width of each of said undesired signal pulses;

coupling means for producing a second signal opposite in polarity to said first signal in response to signals applied to said input;

gate means responsive to said first and second signals for producing third signal pulses; and

signal converter means for converting said third signal pulses to fourth signal pulses identical to said desired signal pulses applied to said input terminal and free of undesired signal pulses mixed therein.

3,970,945

METHOD AND APPARATUS FOR DEMODULATING PSK MODULATED OSCILLATIONS

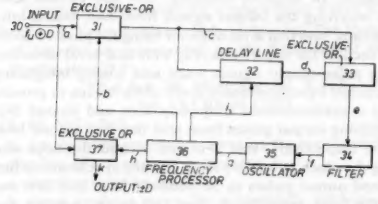
Siegbert Knapp, Ulm (Danube), Germany, assignor to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany

Filed Oct. 29, 1974, Ser. No. 519,780

Claims priority, application Germany, Nov. 2, 1973, 2354718

Int. Cl.² H03K *7/04*

U.S. Cl. 329—104 3 Claims



1. A method of demodulating an input signal modulated according to the phase shift keying method comprising the steps of:

a. combining the input signal with a first reference signal of the same frequency as said input signal but which leads the input signal in phase by one-quarter of the period duration of said input signal;

b. delaying the output signal from said step (a) in time by one-half of the period duration of said input signal;

c. combining the undelayed output signal from said step (a) with the delayed output signal from step (b) to produce a control voltage;

d. controlling the phase of an oscillator with said control voltage to set the phase of said first reference signal and of a second reference signal of the same phase and frequency as said input signal; and

e. combining said second reference signal with said input signal to produce the demodulated output voltage.

3,970,946

DEMODULATOR FOR AMPLITUDE-AND-PHASE MODULATED SIGNALS HAVING CONTROL MEANS FOR REDUCING PHASE AND AMPLITUDE ERRORS

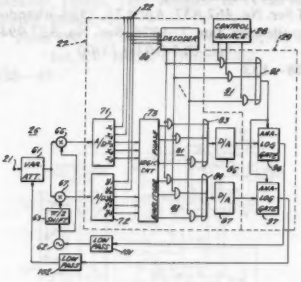
Yoshio Matsuo, Tokyo, Japan, assignor to Nippon Electric Company, Ltd., Tokyo, Japan

Filed July 10, 1974, Ser. No. 487,003

Claims priority, application Japan, July 12, 1973, 48-79004

Int. Cl.² H03D *5/00*

U.S. Cl. 329—104 13 Claims



1. A demodulator for deriving demodulated signals from received signals which have been subjected to amplitude-and-phase modulation, comprising:

a detector comprising first means responsive to said received signals for producing position signals representative of signal points corresponding to said received signals on a reference signal plane of points to which results of demodulation, phase errors of said position signals, and amplitude errors of said position signals are preliminarily assigned in consideration of a predetermined amplitude scale and a predetermined phase reference;

a demodulation and error-detection circuit responsive to said position signals for producing result signals, phase error signals, and amplitude error signals representative of those results of demodulation, phase errors, and amplitude errors which are assigned to said signal points;

means for producing control signals specifying a predetermined area of said reference signal plane; and

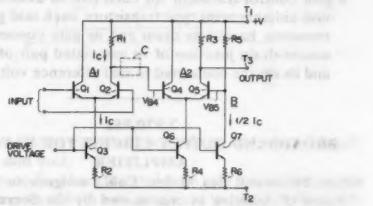
a selection circuit responsive to said control, position, phase error, and amplitude error signals for producing those selected phase and amplitude error signals which are representative of the phase and amplitude errors assigned to the points placed in said predetermined area;

said detector further comprising second means responsive to said selected phase and amplitude error signals for varying said amplitude scale and phase reference to reduce the phase and amplitude errors represented by said phase and amplitude error signals, said result signals thereby becoming said demodulated signals.

3,970,947
MULTI-STAGE DIFFERENTIAL AMPLIFIER CIRCUIT WITH MEANS FOR COMPENSATING THE TEMPERATURE DRIFT OF A CONSTANT CURRENT SOURCE TRANSISTOR

Itsuzo Sato, and Kikuo Saito, both of Yokohama, Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed May 21, 1975, Ser. No. 579,703
Claims priority, application Japan, May 30, 1974, 49-61162
Int. Cl.² H03F 1/32
U.S. Cl. 330—23 8 Claims



8. A multi-stage differential amplifier circuit comprising:

a first differential amplifier means having an output, and a current source transistor means which causes a DC voltage variation at the output with temperature variation;

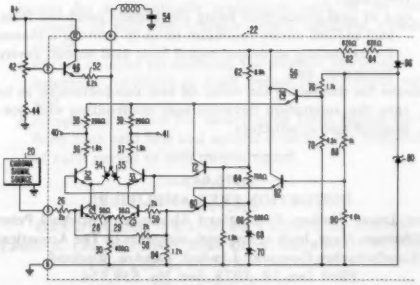
a second differential amplifier means including first and second transistor means each having a base, collector and emitter and connected in differential configuration and means connected with the base of said first transistor means and operative to produce a DC voltage variation with temperature variation which is substantially the same as that at the output of said first differential amplifier means; and

means for direct-coupling the output of said first differential amplifier means with the base of said second transistor means.

3,970,948
CONTROLLER GAIN SIGNAL AMPLIFIER

Leopold Albert Harwood, Somerville, and Erwin Johann Wittmann, North Plainfield, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Dec. 6, 1974, Ser. No. 530,405
Int. Cl.² H03G 3/30
U.S. Cl. 330—29 8 Claims



1. A controllable gain signal amplifier comprising:

a source of signals,

a first signal amplification stage comprising at least a first transistor having a signal input electrode coupled to said source of signals and a main current conduction path including second and third electrodes,

a source of quiescent operating current coupled to said second electrode,

a first current splitter circuit comprising at least a first semiconductor rectifier device providing a first current path and a second transistor having a main current conduction path, said main conduction path of said second transistor and said first current path of said first rectifier device being coupled to said third electrode of said first transistor and being similarly poled for current conduction with respect to said third electrode,

at least one output load circuit coupled to said main conduction path of said second transistor, and

gain controlling means direct current coupled to said first rectifier device for proportioning the relative flow of current of said first transistor through said first current path and said main conduction path of said second transistor, said means comprising

a source of direct voltage,

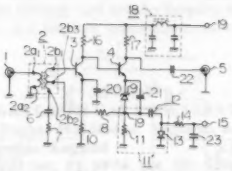
a variable voltage divider coupled across said direct voltage source and having an output terminal at which a selected portion of said voltage is provided,

coupling means comprising at least a third transistor having a base electrode direct current coupled to said output terminal and an emitter electrode, said coupling means further comprising a resistance direct current coupled between said last-named emitter electrode and said first rectifier device for supplying a controllable direct current to said device and thereby proportioning the flow of current through said first rectifier device and said second transistor, whereby the signal gain associated with said second transistor and said load circuit is varied.

3,970,949
HIGH-FREQUENCY AUTOMATIC GAIN CONTROL CIRCUIT

Michio Higuchi, Tokyo, Japan, assignor to Oki Electric Industry Company, Ltd., Tokyo, Japan

Filed Nov. 19, 1974, Ser. No. 525,189
Claims priority, application Japan, Nov. 21, 1973, 48-130175
Int. Cl.² H03G 3/30
U.S. Cl. 330—29 3 Claims

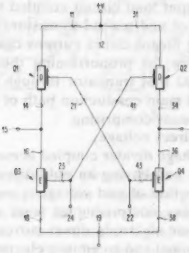


1. A high-frequency automatic gain control circuit for an emitter earthed amplifier wherein a hybrid negative feedback is applied to an input stage thereof from the emitter of an output stage transistor through a hybrid circuit connected to the base of an input stage transistor and a series negative feedback is applied to the output stage thereof, characterized in that a series connection of a diode and a capacitor is connected in shunt with an emitter resistor of the output stage transistor, and that an automatic gain control signal is applied to said diode between said diode and said capacitor for regulating the gain of said amplifier by controlling the negative feedback ratio of said negative feedback.

3,970,950
HIGH COMMON MODE REJECTION DIFFERENTIAL AMPLIFIER UTILIZING ENHANCEMENT DEPLETION FIELD EFFECT TRANSISTORS

Leo B. Freeman, Jr.; Robert J. Incerto, both of Poughkeepsie, and Joseph A. Petrosky, Jr., Wappingers Falls, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 21, 1975, Ser. No. 560,919
Int. Cl.² H03F 3/45
U.S. Cl. 330—30 D **2 Claims**

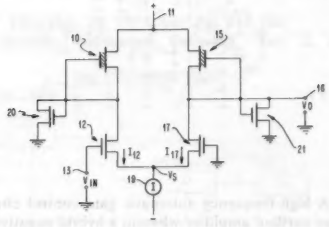


1. A differential amplifier comprising:
- a first depletion mode field effect transistor coupling a drain voltage terminal to a first output terminal, a second depletion mode field effect transistor coupling a drain voltage terminal to a second output terminal;
- a first enhancement mode field effect transistor coupling said first output terminal to a source voltage terminal and having a gate coupled to a first input terminal and a gate electrode of said second depletion mode transistor; and
- a second enhancement mode field effect transistor coupling a second output terminal to its source voltage terminal, and having a gate couple to a second input terminal and a gate electrode of said first depletion mode transistor.

3,970,951
DIFFERENTIAL AMPLIFIER WITH CONSTANT GAIN

Charles Reeves Hoffman, Raleigh, N.C., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 12, 1975, Ser. No. 631,353
Int. Cl.² H03F 3/16
U.S. Cl. 330—30 D **4 Claims**

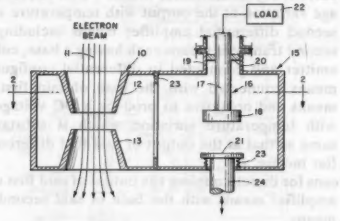


1. A constant gain differential amplifier circuit for integrated circuit use, said circuit comprising:
- a semi-conductive substrate;
- a source of voltage having a drain supply terminal and a source supply terminal;
- a pair of depletion type transistors deposited in said substrate and having their drain electrodes connected to said drain supply;
- a pair of enhancement type transistors also deposited in said substrate, and each having its drain connected to the source and gate of an associated one of said depletion type transistors;
- a connection from the gate of one of said enhancement type transistors to a source of a reference voltage;
- a connection from the gate of the other of said enhancement type transistors to an input signal voltage to be amplified;
- a constant current control interposed between said source supply terminal and the sources of both said enhancement type transistors; and
- a gain control transistor for each pair of associated depletion-enhancement type transistors, each said gain control transistor having its drain and its gate connected to the source-drain junction of its associated pair of transistors and its source connected to said reference voltage source.

3,970,952
BROADBAND OUTPUT CIRCUIT FOR KLYSTRON AMPLIFIER

Albert Mizuhara, San Mateo, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 15, 1975, Ser. No. 577,960
Int. Cl.² H03F 3/56
U.S. Cl. 330—45 **6 Claims**



6. A broadband output circuit for a high power klystron tube comprising, in combination
- a first cavity resonator adapted to be excited by the modulated electron beam of said klystron tube;
- a second cavity resonator;
- an inductive iris coupling said second cavity resonator to said first cavity resonator;
- first and second conductors supported by said second cavity resonator in spaced coaxial alignment with their confronting end portions positioned within said second cavity resonator,
  - one of said conductors being electrically insulated from said second cavity resonator so as to provide a means for extracting an output signal from said second cavity resonator; and
- means for displacing the other of said conductors so as to vary the separation between said confronting end portions of said conductors.

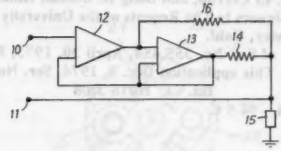
3,970,953
DISTORTION-FREE AMPLIFIERS

Peter James Walker, Hemingford Abbots, and Michael Peter Albinson, Over, both of England, assignors to The Acoustical Manufacturing Company Limited, London, England

Filed Jan. 10, 1975, Ser. No. 539,954
Claims priority, application United Kingdom, Jan. 17, 1974, 2278/74
Int. Cl.² H03F 1/34
U.S. Cl. 330—99 **4 Claims**

4. Apparatus for amplifying electric signals comprising,

a first amplifier of relatively small power,
a load,
means connecting the output of said first amplifier to said load,
a second amplifier of relatively large power connected to said load to be turned on by output from said first amplifier and contribute current to the load,



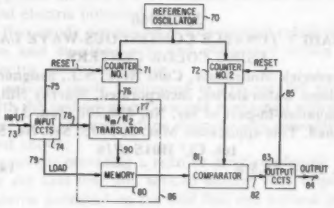
means to monitor current flowing from said second amplifier to said load,
and means to feed back a signal from said monitoring means to the inputs of both said amplifiers to maintain the transfer characteristic of the apparatus independent of the performance of said second amplifier.

3,970,954

DIGITAL FREQUENCY MULTIPLIER

Reed Kamenetzky Even, Livingston, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Apr. 3, 1975, Ser. No. 564,650
Int. Cl.² H03B 19/00
U.S. Cl. 331—53 8 Claims



1. A frequency multiplication circuit comprising
means for receiving input signals,
a reference oscillator,
a first counter for counting the number of cycles of said reference oscillator in each period of said input signals,
means for systematically translating each of the output counts of said first counter into a different translated count,
a second counter for counting the number of cycles of said reference oscillator in each period of an output signal, and
a comparator circuit for determining from signals derived from both said first and second counters the termination of each period of said output signal.

3,970,955

GAS DYNAMIC-TRANSFER CHEMICAL LASER

Lester A. Lee, 405 River Road Drive, Oxon Hill, Md. 20022

Filed Dec. 6, 1974, Ser. No. 530,259
Int. Cl.² H01S 3/22
U.S. Cl. 331—94.5 G 3 Claims

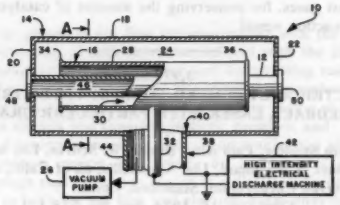
1. In a method of producing a laser beam in a gas dynamic-transfer chemical laser which comprises the steps of subjecting a mixture of a fuel and an oxidizer to combustion in a combustion chamber to produce a mixture of gases consisting essentially of N_2, CO_2, HF, and F, expanding the mixture of gases through a supersonic nozzle, and passing the gas mixture through an optical cavity wherein stimulated emission of radiation from the gas molecules occurs the improvement wherein the fuel is
5-trifluoromethyltetrazole, and a secondary stream of cold D_2 or H_2 is injected into the expanded mixture of gases.

3,970,956

CYLINDRICAL ELECTRON BEAM DIODE

Paul E. Bolduc, Albuquerque, N. Mex., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed July 24, 1975, Ser. No. 598,973
Int. Cl.² H01S 3/09
U.S. Cl. 331—94.5 PE 10 Claims



1. An electron beam diode comprising an elongated generally tubular anode essentially transparent to relativistic electrons; a generally tubular cathode electrode coaxially encircling and spaced from said anode electrode with ends intermediate the ends of said anode electrode; a conductive housing including a generally tubular wall coaxially encircling said cathode and anode electrodes and spaced further from said cathode electrode than said cathode-anode electrode spacing and end walls connected to said anode electrode to substantially enclose said cathode electrode and form an evacuable region between said cathode electrode and said anode electrode and housing; and means for connecting a high energy electrical pulse through said tubular housing wall to said cathode electrode at a location intermediate its ends.

3,970,957

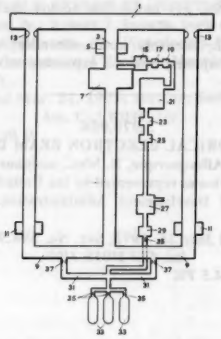
FLOWING GAS LASER GAS REGENERATION SYSTEM

Albert John Regan, Hoddesdon, England, assignor to BOC Limited, London, England

Filed Oct. 21, 1974, Ser. No. 516,495
Claims priority, application United Kingdom, Oct. 23, 1973, 49318/73
Int. Cl.² H01S 3/22
U.S. Cl. 331—94.5 G 15 Claims

1. In a recirculating path electric discharge type gas laser having at least a main recirculation path in which the active laser gas is dissociated into chemical constituents by said discharge and in which the exhausted laser gases are passed through a chemical reactor means for treatment by a catalyst for recombining the constituents into the active laser gas, the improvement comprising means for flowing the gas laser medium fast enough to minimize active laser gas dissociation and means for diverting a very minor portion of the laser gases exhausted from the discharge region from said main recirculation path and for passing only that very minor portion of gases

through said chemical reactor means for catalytically recombining only those constituents in the very minor portion of



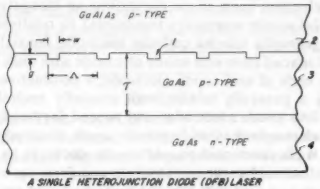
exhaust gases, for conserving the amount of catalyst used in said reaction vessel.

3,970,958

ELECTRICALLY PUMPED, SOLID-STATE DISTRIBUTED FEEDBACK LASER WITH PARTICULAR GRATING SPACING

William Streifer, Palo Alto; Donald R. Scifres, Los Altos, and Robert D. Burnham, Los Altos Hills, all of Calif., assignors to Xerox Corporation, Stamford, Conn.

Filed Oct. 15, 1974, Ser. No. 515,121
Int. Cl.² H01S *3/082*
U.S. Cl. 331—94.5 C **8 Claims**



A SINGLE HETEROJUNCTION DIODE (DFB) LASER

1. An electrically pumped, distributed feedback, diode laser for producing a single, high order mode laser output beam having a selected free space wavelength comprising:

a plurality of layers of semiconductor material, one of said layers of semiconductor material being a light wave guide layer and at least one other of said layers of semiconductor material bordering said light wave guide layer, said light wave guide layer being of a material having an index of refraction greater than the material of said at least one other layer,

said light wave guide layer and a layer in contact with said light wave guide layer being doped such that a rectifying junction is formed at the interface therebetween,

a periodic structure at the interface between two of said plurality of layers of semiconductor material, said periodic structure having a periodicity such that the free space wavelength of each of the higher order modes immediately adjacent said single, higher order mode producing said selected free space wavelength is outside of the spectral width of the gain produced by said periodic structure, whereby only light of said selected free space wavelength experiences a net gain in said laser and said laser output beam is substantially only at said selected free space wavelength, and

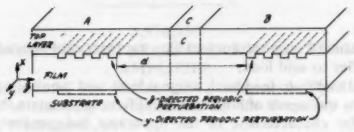
means for forward biasing said rectifying junction to produce an injection of minority carriers into said light wave guide layer to produce said laser output beam having said selected free space wavelength.

3,970,959

TWO DIMENSIONAL DISTRIBUTED FEEDBACK DEVICES AND LASERS

Shyh Wang, El Cerrito, and Sang K. Sheem, Albany, both of Calif., assignors to The Regents of the University of California, Berkeley, Calif.

Division of Ser. No. 355,454, April 30, 1973, Pat. No. 3,884,549. This application Dec. 4, 1974, Ser. No. 529,538
Int. Cl.² H01S *3/08*
U.S. Cl. 331—94.5 C **3 Claims**



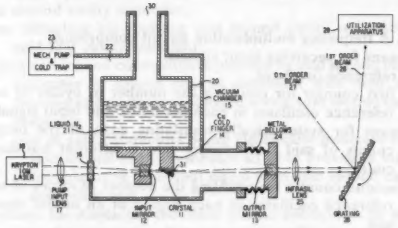
1. A method for forming a thin film optical device including the steps of disposing an upper and lower boundary layers in optical contact with a thin film optical waveguide, imposing fixed perturbations onto one of said boundary layers in regions thereof which are interacted with upon propagation of light in said waveguide, and imposing variable perturbation in the other of said boundary layers for the purpose of varying the frequency response of said device.

3,970,960

BROADLY TUNABLE CONTINUOUS-WAVE LASER USING COLOR CENTERS

Linn Frederick Mollenauer, Colts Neck, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Continuation-in-part of Ser. No. 438,200, Jan. 31, 1974, abandoned. This application Mar. 3, 1975, Ser. No. 554,467
Int. Cl.² H01S *3/16*
U.S. Cl. 331—94.5 F **14 Claims**

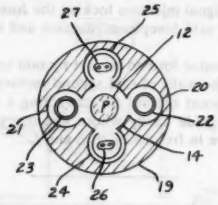


1. Apparatus for the stimulated emission of radiation of the type comprising a body of an alkali halide crystal having color centers capable of substantial absorption of a particular band of radiation, means for supplying the band of radiation to the crystal to produce a population inversion between radiatively coupled energy levels, and means including reflective surfaces associated with the crystal for stimulating the emission of coherent radiation from the inverted population of color centers, characterized in that the apparatus includes means for cooling the crystal by conduction from the crystal, said cooling means including a substantial solid body contacting said crystal and providing an optical path within said body of negligible loss for the stimulated radiation.

3,970,961
THERMIONIC CATHODE TRANSVERSE-DISCHARGE GAS LASER TUBE

Onezime P. Breaux, and Gustav K. Medicus, both of Dayton, Ohio, assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed May 9, 1975, Ser. No. 576,058
Int. Cl.² H01S 3/22, 3/097
U.S. Cl. 331—94.5 PE **5 Claims**



1. A thermionic cathoe transverse-discharge gas laser tube comprising:

a. an electrically conductive substantially tubular envelope having a longitudinal axis, containing a gas for lasing, terminated at each end by a Brewster-angle window, and providing an electric potential surface on the said envelope;

b. a first thermionic cathode positioned in axis-parallel relationship with the said envelope axis within the said electric potential surface.

c. a second thermionic cathode in axis-parallel relationship with the said envelope axis, positioned diametrically opposite the said first thermionic cathode and within the said electric potential surface;

d. a first anode positioned in axis-parallel relationship with the said envelope axis and positioned within the said electric potential surface;

e. a second anode positioned in axis-parallel relationship with the said envelope axis and positioned within the said electric potential surface diametrically opposite the said first anode;

f. means for providing a relative positive electric potential on the said first and second anodes with respect to an electric potential on the said first and second cathodes;

g. means for heating the said first and second thermionic cathodes to provide an emission of electrons from the said cathodes; and

h. means for providing a negative potential on the said electrically conductive envelope with respect to the said cathode potential whereby the said potential surface on the said envelope is electron repelling.

3,970,962
HIGH POWER ELECTRICALLY EXCITED FLOWING GAS LASER

Eugene R. Peressini, Palos Verdes Peninsula; Robert A. Hill, and James M. Kallis, both of Los Angeles, all of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Filed Nov. 7, 1974, Ser. No. 521,715
Int. Cl.² H01S 3/09, 3/22
U.S. Cl. 331—94.5 PE **12 Claims**

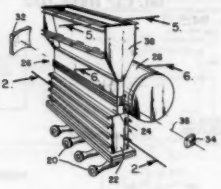
1. A high power electrically excited flowing gas laser comprising in combination:

gas supply means including a plenum chamber for supplying a laser gas at a pressure substantially greater than atmospheric pressure;

means defining a gas flow channel including an excitation region for said laser gas;

means for introducing a cw electron beam into said excitation region in a direction perpendicular to the direction of gas flow and for applying a cw DC electric field across said excitation region in a direction parallel to the direction of said electron beam to provide an electric current sufficient to excite said laser gas to a condition of population inversion;

nozzle means disposed between said plenum chamber and said gas flow channel and spaced from said excitation region for controlling the flow velocity of said laser gas in said flow channel such that said laser gas enters said excitation region at a predetermined subsonic velocity maximizing laser efficiency without causing gas flow instability and at a pressure slightly greater than atmospheric pressure;



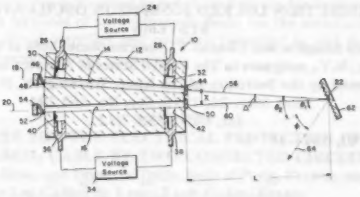
diffuser means in gas flow communication with the downstream end of said flow channel and with the ambient atmosphere for decelerating and compressing said laser gas before exhausting into the ambient atmosphere such that said laser gas leaves said excitation region at a pressure slightly less than atmospheric pressure; and

optical resonator means in optical communication with said excitation region and having an optical axis passing through said excitation region in a direction perpendicular to both the gas flow and electron beam directions for providing a cw laser beam along said axis.

3,970,963
WAVEGUIDE LASER ARRANGEMENT FOR GENERATING AND COMBINING A PLURALITY OF LASER BEAMS

Arthur N. Chester, Malibu, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed May 1, 1975, Ser. No. 573,715
Int. Cl.² H01S 3/082
U.S. Cl. 331—94.5 C **8 Claims**



1. A waveguide laser arrangement for generating and combining a plurality of laser beams comprising:

means for generating a plurality of laser beams of differing wavelengths and for emitting said beams along respective paths converging upon an intersection point, said means including a body of dielectric material defining a plurality of capillary bores therethrough of a diameter suitable for guiding laser light, a laser gas disposed in each of said bores, a plurality of optical resonators independently operatively associated with respective ones of said bores and tuned to different wavelengths, each resonator including a partially transmissive reflector near the end of the associated bore closer to said intersection point, and means for exciting the laser gas in each of said bores to a condition of stimulated emission; and

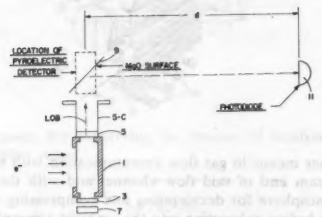
dispersive optical means positioned at said intersection point for combining the laser beams emitted along said respective paths into a composite beam along a coincident path.

3,970,964

HIGH-POWER ARGON/NITROGEN TRANSFER LASER

N. Thomas Olson, Los Angeles; Earl R. Ault, Rolling Hills Estates, and Mani L. Bhaumik, Malibu, all of Calif., assignors to Northrop Corporation, Los Angeles, Calif.

Filed Sept. 5, 1974, Ser. No. 503,454
Int. Cl.² H01S 3/22
U.S. Cl. 331—94.5 G 7 Claims



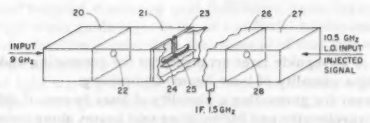
1. A gas laser having an output at 3577A comprising:
means for forming a resonant optical path for stimulating a coherent beam of radiation at,
a gas cell positioned in said optical path,
a lasing gas mixture in said cell having a total absolute pressure of 20 psia – 260 psia, and comprising 4–16% nitrogen and the balance argon,
means for exciting said gas mixture to create a population inversion between the upper and lower energy levels of the 3577A transition of nitrogen by both populating said upper energy level and depopulation said lower energy level via collisions between argon and nitrogen so as to form an oscillating laser light beam at 3577A in said resonant optical path, and
means for coupling a portion of said beam out of said path to provide said output.

3,970,965

INJECTION LOCKED JOSEPHSON OSCILLATOR SYSTEMS

Sidney Shapiro, and Charles V. Stancampiano, both of Rochester, N.Y., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 26, 1975, Ser. No. 562,294
Int. Cl.² H03B 7/12
U.S. Cl. 331—107 S 2 Claims



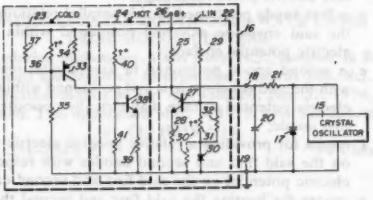
1. A mixer comprising, in combination
a first rectangular waveguide cavity resonant at a frequency f_i,
said first waveguide cavity having one end wall with an aperture formed therein for coupling electromagnetic wave energy into said first cavity;
a second rectangular waveguide cavity resonant at a frequency f_c,
said second waveguide cavity having one end wall with an aperture formed therein for coupling electromagnetic wave energy into said second cavity,
said first and second cavities sharing a common second end wall,
said common end wall having a capacitive slot formed therein at a location intermediate the top and bottom walls of said waveguide cavities;
a Josephson junction positioned within said slot and biased with a DC voltage equal to $hf_c/2e$;
means for coupling an input signal of frequency f_i to said first cavity and a mixing signal of a frequency which is at or near f_c to said second cavity,
said mixing signal injection locking the Josephson oscillator formed by said Josephson junction and said second cavity; and
an output resonator formed in part by said common wall and portions of the walls of said second rectangular waveguide that are adjacent thereof for extracting a signal from said second waveguide cavity whose frequency corresponds to the difference in frequency of f_i and f_c.

3,970,966

CRYSTAL OSCILLATOR TEMPERATURE COMPENSATING CIRCUIT

Anthony Francis Keller, Chicago, and Dennis Fisher Marvin, Bensenville, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Apr. 25, 1975, Ser. No. 571,663
Int. Cl.² H03B 5/04, 5/36
U.S. Cl. 331—116 R 22 Claims



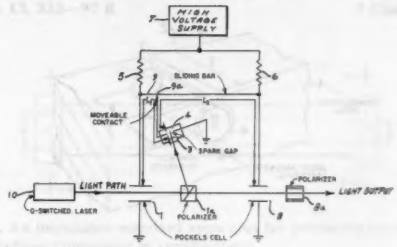
1. A temperature compensating circuit for an oscillator having a frequency determining crystal and operative in cold, middle, and hot temperature ranges, comprising:
voltage variable reactance means coupled to the cyrstal of the oscillator for varying the oscillator frequency in response to a voltage applied to said reactance means;
compensating means for generating a control voltage with a voltage versus temperature characteristic having a substantially linear variation in said middle temperature range and a substantially non-linear variation in at least one of said hot and cold temperature ranges; and
means for coupling said control voltage to said reactance means whereby said oscillator frequency is maintained at a substantaily constant value over all of said temperature ranges;
said compensating means including first circuit means for independently creating said linear variation in said middle range and second circuit means for substantially creating said non-linear variation in said one of said temperature ranges, said second circuit means including circuitry for independently determining the operative temperature range in which said second circuit means produces any substantial variation in said control voltage as a function of temperature.

3,970,967

CONTROLLABLE ULTRAFAST LIGHT SHUTTER

Robert L. Iliff, Canton, Mass., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Oct. 22, 1974, Ser. No. 516,935
Int. Cl.² H01S 3/10
U.S. Cl. 332—7.51 1 Claim



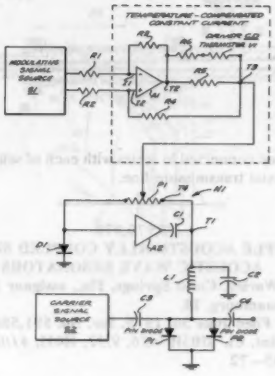
1. A controllable ultrafast light shutter to provide an ultrashort laser pulse of selectable duration in the picosecond region consisting essentially of a Q switched laser providing a polarized light pulse of a first preselected duration to be reduced to a second preselected duration in said picosecond region, a first Pockels cell having a high voltage side, a first polarizer associated with said first Pockels cell to provide a first combination, a second Pockels cell having a high voltage side, a second polarizer associated with said second Pockels cell to provide a second combination, said Q switched laser, said first Pockels cells, said first polarizer, said second Pockels cells, said second polarizer being arranged on a common longitudinal axis and in the recited sequence with said polarized light pulse being the input light pulse to said first Pockels cell and said second polarizer providing the output pulse of said second preselected duration, a spark gap having first and second electrodes, said second electrode being grounded, a lens associated with said spark gap, a sliding bar having first and second ends, a high voltage supply, first and second current limiting resistors, said first current limiting resistor connected between said high voltage supply and said first end of said sliding bar, said second current limiting resistor connected between said high voltage supply and said second end of said sliding bar, a sliding contact for said sliding bar connected to said first electrode of said spark gap, a first cable consisting of the electrical connection from said high voltage side of said first Pockels cell to said first end of said sliding bar to said first electrode of said spark gap, a second cable consisting of the electrical connection from the high voltage side of said second Pockels cell to said second end of said sliding bar to said first electrode of said spark gap, said second cable being of greater length than said first cable, said input light pulse to said first Pockels cell passing through said first combination with said first polarizer rotating the input light pulse 90° during the passage therethrough and also simultaneously deflecting the light pulse to said lens, said lens focusing the deflected light pulse between said electrodes of said spark gap and upon breakdown thereof grounding said high voltage sides of said first and second Pockels cells causing the remainder of the light pulse to pass through said first and second combinations unaffected, said first combination being now in the on condition allowing the remainder of the pulse to pass through while said second combination goes to the off condition closing the light shutter, said light shutter being open for the length of time determined by the length of said second cable subtracted from the length of said first cable with the difference in length being divided by the velocity in the cables.

3,970,968

SIGNAL MODULATOR APPARATUS

Thomas L. Sly, Clay, N.Y., assignor to Anaren Microwave, Incorporated, Syracuse, N.Y.

Filed Jan. 30, 1975, Ser. No. 545,378
Int. Cl.² H03C 1/14
U.S. Cl. 332—37 D 7 Claims



1. Apparatus for use in signal modulators comprising: a constant current amplifier having temperature compensating means, an input adapted to receive a modulating signal and an output for transmitting a temperature-compensated modulating current; a reference diode having first and second terminals first connecting means for connecting a first terminal of said reference diode to the output of said constant current amplifier; grounding means for signal grounding the second terminal of said reference diode; a modulating current output terminal; second connecting means for connecting the output of said constant current amplifier to said modulating current output terminal; a signal amplifier with unity gain and a coupling capacitor connected in series; and means for connecting the first terminal of said reference diode via the series circuit of said signal amplifier and coupling capacitor to said modulating current output terminal.

3,970,969

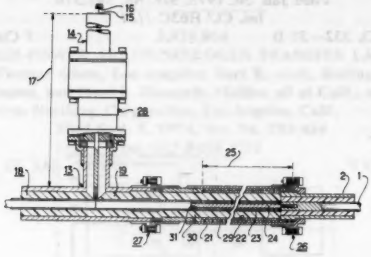
DEVICE FOR THE ELECTRICAL PROTECTION OF A COAXIAL CABLE BY TWO CONNECTED CIRCUITS

Michel Sirel, and Francois Taille, both of Paris, France, assignors to Les Cables de Lyon, Lyon Cedex, France

Filed Dec. 13, 1974, Ser. No. 532,482
Claims priority, application France, Dec. 18, 1973, 73.45204
Int. Cl.² H01P 1/00
U.S. Cl. 333—12 3 Claims

1. A device providing double protection for a coaxial transmission line having two conductors, said device comprising two circuits, one of said circuits being connected in parallel to said line for equipotentiality and being formed by a T-connection including arms equal to one quarter of the wavelength to be transmitted, the other of said circuits being connected in series to said line for decoupling the line from spurious low frequencies, both of said circuits having parameters for providing high frequency coupling in said line, the decoupling circuit being integrated into one of said arms of said equipotentiality circuit, a cut being provided in each of the conduc-

tors of said transmission line for connection with said circuits, the decoupling circuit being a quarter-wave line having an



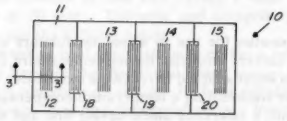
open end and connected in series with each of said conductors of said coaxial transmission line.

3,970,970

MULTIPLE ACOUSTICALLY COUPLED SURFACE ACOUSTIC WAVE RESONATORS

James C. Worley, Coral Springs, Fla., assignor to Motorola, Inc., Schaumburg, Ill.

Filed June 30, 1975, Ser. No. 591,588
Int. Cl.² H03H 9/26, 9/32; H01L 41/04
U.S. Cl. 333—72 8 Claims



1. Multiple acoustically coupled surface acoustic wave resonators comprising:

a. a base of piezoelectrically active material;

b. a first surface wave acoustic resonator having a resonant frequency and including a first transducer affixed to said base for propagating surface waves on said base along a predetermined axis of said base upon proper energization of said first transducer, and first reflectors formed on said base on each side of said first transducer along the predetermined axis and spaced from each other a multiple of one-half wavelength of the resonant frequency of said first resonator for producing a standing wave between said first reflectors when said first transducer is properly energized;

c. a second surface wave acoustic resonator positioned on said base along the predetermined axis in spaced relation from said first resonator and having a resonant frequency and including a second transducer for propagating surface waves on said base upon proper energization of said second transducer, and second reflectors formed on said base on each side of said second transducer along the predetermined axis and spaced from each other a multiple of one-half wavelengths of the resonant frequency of said second resonator for producing a standing wave between said second reflectors when said second transducer is properly energized; and

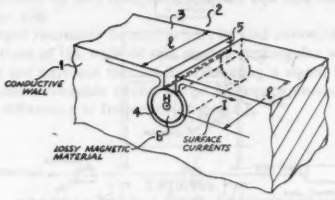
d. the outermost first and second reflectors being constructed with substantially one hundred percent reflectivity of energy at the resonant frequency of the first and second resonators, respectively, and the innermost or adjacent first and second reflectors being constructed with less reflectivity for providing acoustical coupling between said first and second resonators.

3,970,971

PARASITIC WAVE ATTENUATOR USEABLE IN HIGH FREQUENCY ELECTRONIC TUBES

Georges Mourier, Paris, France, assignor to Thomson-CSF, Paris, France

Filed June 5, 1975, Ser. No. 583,970
Claims priority, application France, June 11, 1974, 71.20155
Int. Cl.² H01P 1/22
U.S. Cl. 333—81 R 8 Claims



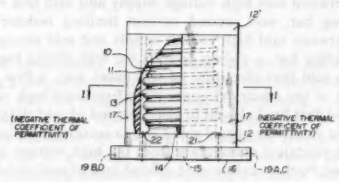
1. A device for attenuation very short parasitic waves generating surface currents at a surface of a conductive wall of a high frequency circuit, said device comprising an element made of a material which is electrically non-conductive and which exhibits magnetic losses when subjected to an alternating magnetic field, said element being arranged in an opening formed in said conductive wall, said opening being so designed and disposed related to said conductive wall that it creates an electrical discontinuity at said surface of said wall, said surface electrical discontinuity forcing said surface currents to make a loop around said element, said current loop generating inside said element an alternating magnetic field.

3,970,972

SHOCK RESISTANT, TEMPERATURE COMPENSATED HELICAL RESONATOR

Charles Brian David Bunner, Carp, Canada, assignor to Northern Electric Company Limited, Montreal, Canada

Filed May 12, 1975, Ser. No. 576,277
Int. Cl.² H01P 1/30, 7/04
U.S. Cl. 333—82 BT 12 Claims



1. A helical resonator structure, comprising:

a. a housing having inside walls and an end portion, and being of a conductive material having a first positive thermal coefficient of expansion;

b. a form of dielectric material inside said housing spaced from the inside walls and supported by said end portion, said form supporting a thereon wound helical conductor of a material having a second positive thermal coefficient of expansion; and

c. rigid dielectric filling disposed in selected locations contiguous said helical conductor and the inside walls in the space therebetween, said dielectric filling being of a predetermined amount to produce an average permittivity of the total of said space that is larger than that of air but less than that of the dielectric filling material, and said dielec-

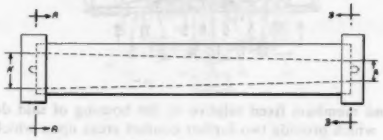
tric filling material having a negative thermal coefficient of permittivity.

3,970,973

IMPEDANCE STANDARD APPARATUS

Frank Lazzaro, Lancaster, Ohio, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Sept. 25, 1974, Ser. No. 509,200
Int. Cl.² H01P *1/24, 3/12, 1/04*
U.S. Cl. 333—97 R **7 Claims**



1. An impedance standard apparatus for producing known reflections comprising in combination:

taper forming means having a predetermined length, said taper forming means having a first and second end, said first and second end respectively having the same cross-sectional area and shape, said first end having a first predetermined dimension, said second end having a second predetermined dimension, said first predetermined dimension being larger than said second predetermined dimension, said taper forming means with said first and second end provides a two-port device with a mathematically predictable VSWR, said two-port device being inserted between a matched generator and load, and

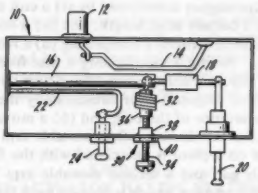
means for connecting joined to said taper forming means, said connecting means attached to said first and second end respectively of said taper forming means, said connecting means being substantially identical.

3,970,974

TRIMMER FOR A TUNED UHF LINE

Elmer Bastian, Union, Ill., assignor to Oak Industries Inc., Crystal Lake, Ill.

Continuation of Ser. No. 307,929, Nov. 20, 1972, abandoned.
This application Apr. 24, 1974, Ser. No. 463,782
Int. Cl.² H03J *3/20*
U.S. Cl. 334—45 **6 Claims**



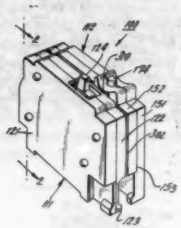
1. In a UHF tuner, a chassis, at least two cavities in the chassis, shields between said cavities, one of said cavities including an antenna resonator, another of said cavities including mutually coupled RF amplifier and mixer resonators, a shield between said mutually coupled RF amplifier and mixer resonators, a trimmer capacitor having minimum capacity near the upper end of the UHF band in each of said cavities having a resonator, said trimmer capacitor including a fixed electrode connected to said resonator and formed from a plurality of helically arranged insulated turns of wire, an insulating sleeve mounted inside said turns of wire and defining a central passage, a movable electrode positioned to move in and out of the central passage of said fixed electrode, and support means for said movable electrode.

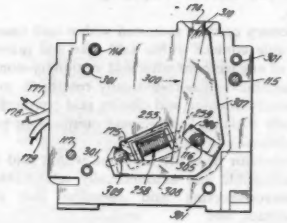
3,970,975

GROUND FAULT CIRCUIT BREAKER WITH GROUND FAULT TRIP INDICATOR

Carl E. Gryctko, Haddon Heights, N.J., assignor to I-T-E Imperial Corporation, Spring House, Pa.

Filed May 5, 1975, Ser. No. 574,596
Int. Cl.² H01H *83/02*
U.S. Cl. 335—18 **10 Claims**





1. Electrical protective equipment comprising a circuit breaker including a set of cooperating contacts, an operating means connected to said set of contacts and including an operating handle and a latchable member, latch means for maintaining said latchable member in latched position wherin said operating means through manual operation of said handle is effective to open and close said set of contacts, overload sensing means for actuating said operating means to open said contacts by automatically operating said latch means to release said latchable member upon the occurrence of predetermined overload conditions; fault responsive means including a fault detecting means and an electromagnet energized by said fault detecting means upon the occurrence of predetermined fault conditions; said electromagnet including a relatively stationary magnetic yoke and an armature movable relative to said yoke; trip means operated by said armature means upon energization of said electromagnet to move said latch means and thereby release said latchable member whereby said operating means opens said set of contacts; indicator means operated by said armature means upon energization of said electromagnet to move said indicator means from a retracted to an indicating position wherein an indicating portion thereof is readily viewable to indicate that said predetermined fault condition has occurred.

3,970,976

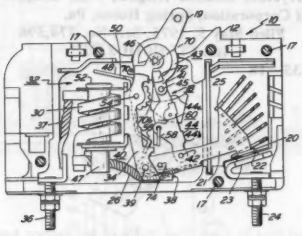
CIRCUIT BREAKER WITH CENTER TRIP POSITION

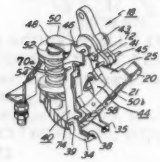
Ronald Nicol, Trenton, N.J., assignor to Heinemann Electric Company, Trenton, N.J.

Filed Apr. 4, 1975, Ser. No. 565,271

Int. Cl.[2] H01H 73/00, 75/00

U.S. Cl. 335—21 8 Claims





1. A circuit breaker comprising

a case,

a stationary contact mounted within said case,

a movable contact within said case and movable into and out of engagement with said stationary contact,

a collapsible and automatically resettable mechanism for manually opening and closing said contacts and for electrically tripping "open" said contacts on predetermined conditions comprising

an operator pivotally mounted within said case,

a collapsible and automatically relatchable linkage for interconnecting said operator and said movable contact, and

means for collapsing said collapsible and automatically relatchable linkage upon predetermined electrical overloads to move said contacts from the contacts "closed" position to the contacts "open" position,

restraining means movable as part of said mechanism upon electrical tripping "open" of said contacts to a position for restraining said operator in a position intermediate the "open" and "closed" positions of said operator to defeat said collapsible and automatically relatchable linkage, whereby said operator is maintained in a position intermediate the "open" and "closed" positions of said contacts upon electrical tripping of said contacts and said collapsible and automatically relatchable linkage is prevented from automatically relatching until the restraint is removed.

3,970,977

ARRANGEMENT FOR MOUNTING THE NON-SWITCHING MAGNET PART

Günther Weissberger, Riedenburg, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Feb. 26, 1975, Ser. No. 553,137

Claims priority, application Germany, Mar. 11, 1974, 2411539

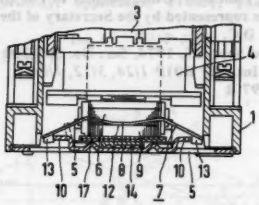
Int. Cl.[2] H01H 50/04

U.S. Cl. 335—132 10 Claims

1. Apparatus for use in the elastic, resilient mounting of a non-switching magnet part of an electromagnetic switching device to the base plate thereof and in the direction of the magnetic force thereof comprising:

a ring-shaped leaf spring which is closed in itself;

at least two contact areas provided on said magnet part upon which a first side of said spring rests;



and members fixed relative to the housing of said device which provide two further contact areas upon which the side of said spring opposite said first side rests.

3,970,978

ELECTROMAGNET

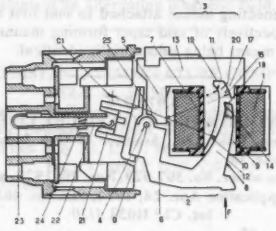
Michel Langree, Poitiers, France, assignor to La Telemecanique Electrique, France

Filed Jan. 3, 1975, Ser. No. 538,384

Claims priority, application France, Jan. 31, 1974, 74.03255

Int. Cl.[2] H01H 50/18

U.S. Cl. 335—203 5 Claims



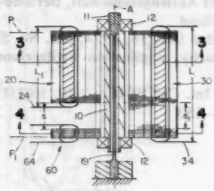
1. An electromagnet constituted by (i) a coil the inner zone of which has a certain axial length, and (ii) a magnetic structure, said magnetic structure comprising (a) a fixed core in the form of a "U" having a base joining a first fixed arm placed externally of the coil, and a second fixed arm having a convex external surface disposed over substantially the whole of its length, in the interior of the coil, and (b) a movable armature in the form of a "U" having a first movable arm of which one end mounted on a pivot is associated with the first fixed arm by a small air gap and a second movable arm having a first internal curved surface which is spaced by a first variable air gap from the external curved surface of the second fixed arm, and of which the end is provided with a pole surface which is transverse with respect to said first variable air gap and which is spaced by a second variable air gap from a transverse fixed surface on an extension of the base, the said extension comprising an auxiliary concave surface disposed over a portion of its length within the coil and directed towards the external convex surface, the end of the second movable arm becoming disposed, when the coil is energised, in a space between the curved external surface of the second fixed arm, the auxiliary concave surface and the transverse fixed surface, the magnetic attraction of the said end becoming effective when it is engaged substantially half way into said space.

3,970,979

LIMITED ROTATION MOTOR WITH VELOCITY SENSING SYSTEM

Jean I. Montagu, Brookline, Mass., assignor to General Scanning Inc., Watertown, Mass.

Filed July 2, 1975, Ser. No. 592,620
Int. Cl.² H01F 7/14
U.S. Cl. 335—229 9 Claims



1. In a limited rotation motor comprising:
a rotor which is elongated in the direction of its axis of rotation and has faces for interaction with stator faces,
magnet means extending lengthwise of the rotor and adapted to produce bias flux,
stator means extending lengthwise of the rotor constructed to conduct said bias flux between stator faces, thereby to complete with said rotor a magnetic circuit for said bias flux,
a drive system comprising a plurality of drive structures extending lengthwise of the rotor, each comprising a drive coil for producing drive flux and a stator constructed to conduct said drive flux between stator faces thereby to complete with said rotor magnetic circuits for said drive flux,
the rotor adapted to be driven by interaction of said drive and bias fluxes;
the improvement wherein:
one of said drive structures is shorter in axial dimension than another and
a velocity sensor structure is disposed on the same side of the rotor as said shorter drive structure and spaced axially therefrom,
said sensor structure comprising a discrete sensor stator associated with a sensing coil and constructed to conduct flux from a magnet means between sensor stator faces, thereby to complete with said rotor a magnetic circuit for said flux,
and said sensor coil disposed to receive an induced current in response to modulation of flux in the latter magnetic circuit caused by movement of said rotor,
whereby said sensor structure can be compactly arranged with said drive system and produce useful velocity information.

3,970,980

ROTARY ACTUATOR HAVING STATIONARY ARMATURE AND ROTARY FIELD

Victor Nelson, 10 Redwood Drive, Dix Hills, N.Y. 11746

Filed May 15, 1975, Ser. No. 577,720
Int. Cl.² H01F 7/08
U.S. Cl. 335—253 11 Claims

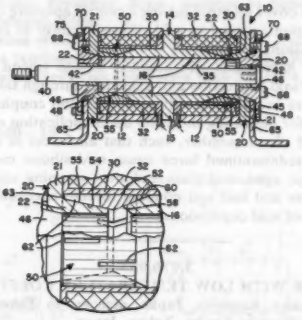
1. A rotary actuator comprising:
a stationary armature having a plurality of magnetic arms defining fixed poles angularly disposed with respect to each other;
a cylindrical rotor having a first and second cylindrically curved permanently magnetized field pole of opposite polarity circumferentially spaced apart and surrounding said armature;
a mechanical stop means for limiting the angular rotation of said rotor, said mechanical stop means comprising:
a first and second stop member fixed in position with respect to said rotor and spaced apart angularly; and
an arm means projecting from said rotor and arranged to contact said stop members and thereby end angular rotation of said rotor; and
a motive means connected to said armature for applying torque to said rotor thereby angularly rotating same whereby the application of torque to said rotor cause rotation of said rotor so that said arm means rotates from said first stop member through an angle whereby said first rotor field pole remains latched to one of said armature magnetic arms and when the torque is removed from said rotor, said rotor rotates toward said first stop member until said arm means contacts said first stop member and when the application of torque to said rotor is such that said rotor rotates through an angle whereby said first rotor field pole is latched to a second of said armature poles and when torque from said motive means is removed from said rotor said arm means will contact said second stop member.

3,970,981

ELECTRIC SOLENOID STRUCTURE

George T. Coors, Tipp City, Ohio, assignor to Ledex, Inc., Dayton, Ohio

Filed May 8, 1975, Ser. No. 575,510
Int. Cl.² H01F 7/18
U.S. Cl. 335—266 2 Claims



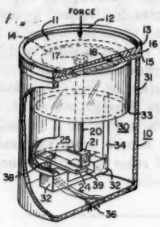
1. In a proportional type solenoid having a hub with a cylindrical extending portion and a base having an annular tapered portion, said hub and said base each being provided with a coaxial cylindrical opening therethrough, and means mounting a cylindrical armature for movement within said hub and said base portion, and in which said hub and base are magnetically, axially separated, the improvement for providing and assuring coaxial alignment of said hub and base comprising:
means on said hub cylindrical portion defining an external taper at the end thereof adjacent said base portion, and
an annular alignment piece formed of non-magnetic material provided with a pair of internal tapers which are proportioned respectively to mate with the external tapers of siad base and hub portions and having an outside diameter which is substantially coincidental with the outside diameter of said hub, to maintain said hub in coaxial alignment with said base.

3,970,982

BEAM TYPE TRANSDUCERS EMPLOYING ACCURATE, INTEGRAL FORCE LIMITING

Anthony D. Kurtz, Englewood; Joseph R. Mallon, Alpine; Amnon Brosh, Demarest, and James William Bice, Wayne, all of N.J., assignors to Kulite Semiconductor Products, Inc., Ridgefield, N.J.

Filed July 7, 1975, Ser. No. 593,631
Int. Cl.² G01L 1/22
U.S. Cl. 338—4 18 Claims



1. In a beam type transducer of the type employing a deflectable beam having positioned on a surface thereof, at least one force responsive element, in combination therewith means for transmitting a force to said beam employing means for accurately stopping said beam for all forces in excess of a predetermined force, comprising:

a. a silicon member having a central shallow depression on a surface thereof, said depression being of a predetermined depth selected according to said predetermined force,

b. a glass cover member having a central aperture of a given dimension coupled to said silicon member to cover said depression,

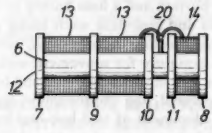
c. a rod having one end coupled to said silicon member within said depression and extending through said central aperture in said glass with said other end coupled to said beam for deflecting the same upon application of a force to said silcon member, such that all forces in excess of said predetermined force cause said silicon member to impinge upon said glass and thus stopping said silicon member and said rod coupled thereto according to the depth of said depression.

3,970,983

RESISTOR WITH LOW TEMPERATURE COEFFICIENT

Isao Hayasaka, Kounosu, Japan, assignor to Takeda Riken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 27, 1975, Ser. No. 544,451
Claims priority, application Japan, Jan. 30, 1974, 49-12457
Int. Cl.² H01C 7/06
U.S. Cl. 338—9 5 Claims



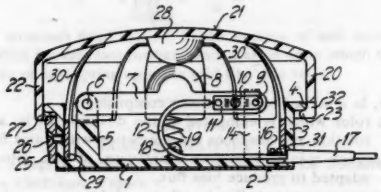
1. A resistor having a low thermal coefficient comprising a main wire resistor having a thermal coefficient of α_1, and an auxiliary resistor having a value of resistance less than that of said main resistor connected in series with the main wire resistor, said auxiliary resistor having a thermal coefficient of α_2 which is of opposite sign to that of α_1, the resistance value of said auxiliary resistor being $R_0\ \alpha_1/\alpha_2$, where R_0 represents the composite series resistance of the main wire resistor and the auxiliary resistor, and where the ratio α_1/α_2 does not exceed 0.01.

3,970,984

SWITCH HAVING HEMISPHERICAL PIVOTAL COVER ACTUATOR FOR MOVABLE LEVER CONTACT MEMBER

Manfred Grubenmann, Steckborn, Switzerland, assignor to Fritz Gegauf Aktiengesellschaft, Bernina-Nahmaschinenfabrik, Switzerland

Filed Dec. 16, 1974, Ser. No. 533,210
Claims priority, application Switzerland, Jan. 10, 1974, 274/74
Int. Cl.² H01C 10/30; H01H 3/14
U.S. Cl. 338—153 8 Claims



7. A foot control operated rheostat, comprising the fixed support base, a spring member having an annular base for the plurality of upstanding hemispherical curved wall portions, each wall portion terminating in tops which are spaced apart to leave a central opening, a generally hemispherically formed cover foot actuator member overlying said spring and having a hemispherical portion centered within the tops of said spring, the lever contact member having one end pivotally supported on said support base and having an opposite movable contact end, electrically conductive contact insulatably supported on said lever member contact end, said lever member having an intermediate portion with a hemispherical part cooperatively engaged with the hemispherical portion of said cover and cooperating with said spring to provide a universal support for said cover, an upstanding fixed contact member arranged alongside said movable contact end and engageable with said electrically conductive contact, spring means urging said lever member to an inoperative position, said lever member being movable by depression of said cover member to advance said movable contact along said fixed contact.

8. A switch construction according to claim 7, wherein said fixed contact comprises a variable resistance element, said movable contact being advanceable along said element for changing the setting thereof.

3,970,985

LINEAL CONTROLLED RESISTANCE DEVICE

William S. Sage, 1922 Grovehaven, Memphis, Tenn. 38116

Filed July 30, 1975, Ser. No. 600,439
Int. Cl.² H01C 10/32
U.S. Cl. 338—162 10 Claims

1. Linear controlled resistance means for controlling the amount of resistance in an electric circuit, said resistance means comprising:

a. body means;

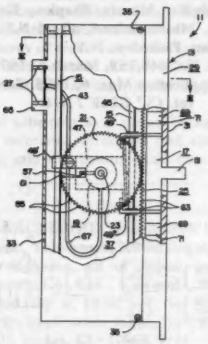
b. guide rod means fixedly attached to said body means;

c. carriage means slidably mounted on said guide rod means;

d. variable resistor means fixedly attached to said carriage means, said variable resistor means including a shaft for allowing the resistance of said variable resistor means to be varied by rotary movement thereof;

e. a pinion gear fixedly attached to said shaft of said variable resistor means;

f. a rack gear fixedly attached to said body means in engagement with said pinion gear whereby manual linear movement of said carriage means back and forth upon said



guide rod means will cause rotary movement of said shaft of said variable resistor means thereby varying the resistance of said variable resistor means; and

g. terminal means attached to said variable resistor means for connecting said variable resistor means to the electric circuit.

3,970,986

THICK FILM ROTARY SWITCH

Gerard Seyler, Des Plaines, and Kenneth J. Roback, Niles, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jan. 30, 1975, Ser. No. 545,456

Int. Cl.[2] H01C *10/00, 10/06*

U.S. Cl. 338—171 **18 Claims**

1. An electrical switch comprising

a housing having a central aperture therethrough and having a shaped, recessed opening at one end,

a thrust plate having

a central aperture therethrough, and

a shaped exterior cross section,

the thrust plate being mounted within the recessed opening of the housing for limited axial movement therein, the shaped recessed opening of the housing and the shaped exterior cross section of the thrust plate cooperating to prevent rotational movement of the thrust plate relative to the housing,

a rotor rotatably mounted within the housing having

a shaft at one end extending outwardly of the switch through the central aperture of the housing and thrust plate and adapted for imparting rotational movement to the rotor, and

an enlarged base at the other end,

indexing means formed between the thrust plate and rotor base for positioning the rotor in a predetermined position within the arc of rotation of the rotor,

means for axially biasing the indexing means into engagement,

means securing the shaft to the housing,

contact means secured to the base of the rotor for rotation therewith and electrically isolated therefrom, and

an end plate secured to the recessed opening of the housing for closing the end thereof and having interior and exterior surfaces, electrical circuit elements mounted on the interior surface electrically isolated therefrom and terminating in a pair of output terminals extending outwardly of the housing,

the electrical circuit elements being predeterminedly arranged in a geometric configuration having portions in alignment with the contact means for selectively being contacted by the contact means in relation to the selected rotational position of the rotor to complete the electrical circuit between the output terminals,

the contacting means being of continuous conductive material for shunting non-selected portions of the circuit elements,

whereby selected portions of the electrical circuit elements are electrically connected between the output terminals.

3,970,987

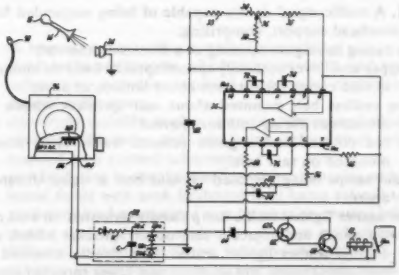
ACOUSTICAL SWITCH

Eric A. Kolm, Brookline, Mass., assignor to Signal Science, Inc., Holliston, Mass.

Continuation of Ser. No. 281,420, Aug. 17, 1972, abandoned, which is a continuation-in-part of Ser. No. 225,230, Feb. 10, 1972, abandoned. This application May 31, 1974, Ser. No. 474,875

Int. Cl.[2] H04B *11/00*

U.S. Cl. 340—15 **18 Claims**



1. An acoustical switch comprising

A. an acoustical transducer for converting sounds into AC signals,

B. an amplifying circuit connected to amplify a selected band of AC signals received from said transducer in the upper audible or ultrasonic frequency range,

C. means for connecting said switch to a power source, and

D. a switching circuit

1. operative in response to the AC output of said amplifying circuit, and

2. arranged to alternately connect said power source to and disconnect it from an appliance upon the occurrence of successive outputs from said transducer, said switching circuit including

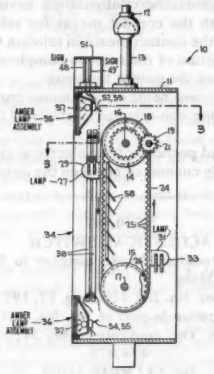
a. an operational amplifier,
b. means for applying the AC signal to one input of the amplifier,
c. means for coupling the output voltage of the amplifier to another input thereof so that the output voltage tends to fluctuate with the a.c. signal, and
d. means associated with the amplifier for temporarily desensitizing the switching circuit during selected half-cycles of the AC signal so that the amplifier output voltage remains substantially at the value it first changed to on commencement of the AC signal.

3,970,988

CONVEYOR-TYPE TRAFFIC SIGNAL DEVICE

Ralph W. Gilmore, P.O. Box 426, Brundidge, Ala. 36010

Filed May 15, 1975, Ser. No. 577,861
Int. Cl.² G08G *1/00*
U.S. Cl. 340—43 **5 Claims**



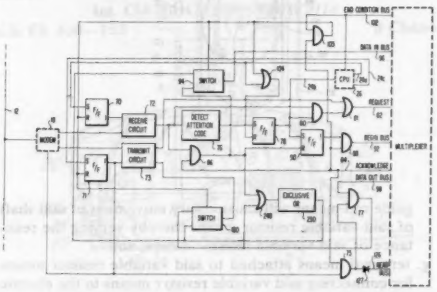
1. A traffic signal device capable of being suspended from an overhead support, comprising:
a casing having an opening at a front side thereof;
upper and lower vertically spaced sprocket wheels mounted in said casing for rotation about horizontal axes;
an endless belt mounted about said sprocket wheels for movement during rotation thereof;
a red colored and a green colored traffic lamp fixedly mounted on said belt;
said lamps being disposed on said belt at equal distances apart;
an amber lighted traffic lamp fixedly mounted on said casing above and adjacent said upper sprocket wheel, and another amber lighted traffic lamp fixedly mounted on said casing below and adjacent said lower sprocket wheel, said amber traffic lamps facing toward said front side of said casing and respectively defining upper and lower edges of said front side;
electrical, elongated contact elements on said front side of said casing extending vertically between and slightly outwardly of the horizontal axes of said sprocket wheels;
electric circuit means, said contact elements being connected to said means; and
electric contact elements on each of said red colored and green colored lamps respectively disposed for contacting engagement with said elongated contact elements;
whereby said red colored and green colored lamps are respectively lighted only upon downward movement between said sprocket wheels when their said contact elements are in contact with said elongated contact elements thereby permitting a viewer to readily observe the time remaining for a traffic light change.

3,970,989

DATA TRANSFER ERROR CHECK

David Ophir, Melville; Marvin Shapiro, Huntington, and Bruce Komusin, Middle Island, all of N.Y., assignors to Ontel Corporation, Plainview, N.Y.

Division of Ser. No. 448,759, March 6, 1974, Pat. No. 3,921,148. This application Mar. 6, 1975, Ser. No. 555,944
Int. Cl.² G06F *11/10*
U.S. Cl. 340—146.1 AG **3 Claims**



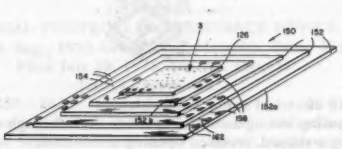
1. In a method of transferring coded characters including in sequence at least one initial control character, a plurality of data characters, an end control character, and a true block check character wherein normally the true block check character is derived from the plurality of data characters and the end control character, the improvement comprising the steps of:
a. forming a modified block check character from initial control characters, the data characters, the end control character and the true block check character;
b. forming a compensating block check character from all transferred characters normally not included in the true block check character;
c. combining the modified block check character with the compensating block check character; and
d. generating an error signal in the event the result of step (c) indicates an incorrect transfer.

3,970,990

ADAPTIVE IMAGING SYSTEM

John C. Carson, Newport Beach, Calif., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.

Division of Ser. No. 265,144, June 22, 1972, Pat. No. 3,852,714. This application Nov. 11, 1974, Ser. No. 522,476
Int. Cl.² G06K *9/00*; H01J *39/12*
U.S. Cl. 340—146.3 F **8 Claims**



1. A method for making sensor module for use in an adaptive imaging system comprising
forming various patterns of metalized via holes in various wafers, and forming various patterns of conductors and coupling terminals on said wafers such that each said conductor extends from one of said via holes to one of said terminals;

stacking and cofiring said wafers with said via holes aligned to form a mesa structure with exposed shelves and with continuous vias of various lengths therein, said terminals being disposed along said exposed shelves;

forming a pattern of metalized dots in, and a pattern of reference terminals and signal terminals on, a substrate, said reference terminals and said signal terminals being connected to respective dots;

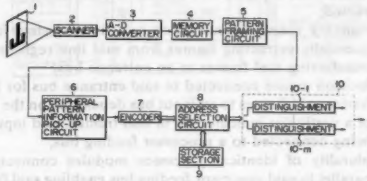
forming an array of electro-optic detectors on said substrate with each said detector connected at one end to a reference terminal and at its opposite end a signal terminal; and

bonding said substrate to a surface of said mesa structure with said reference terminals and said signal terminals coupled to said vias through said dots.

3,970,991
CHARACTER RECOGNITION SYSTEM

Tsutomu Kawada, Yokohama; Kunio Sakai, Tokyo, and Kenichi Mori, Yokohama, all of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed Nov. 6, 1974, Ser. No. 521,449
Claims priority, application Japan, Nov. 8, 1973, 48-124956
Int. Cl.² G06K 9/12
U.S. Cl. 340—146.3 AC **4 Claims**



1. A character recognition system for recognizing a character pattern on a character document having an actual character area including four peripheral sections corresponding to the respective four sides of the character pattern including character line portions and a blank area surrounding the actual character area comprising:

scanning means for scanning the character documents to generate character pattern analogue signals;

binary coding means for converting the character pattern signals from the scanning means into a plurality of character pattern digital signals including digital signals constituting four peripheral information units corresponding to the four peripheral sections, each of the four peripheral information units including at least one continuous digital signal train corresponding to the length of the character line portion;

memory means for storing the character pattern binary coded digital signals obtained from the binary coding means;

pattern framing means for framing the actual character area of the character document on the basis of the character pattern binary coded digital signals stored in the memory means;

peripheral pattern information unit pick-up means for reading out from the memory means the four peripheral information units in accordance with the framing data from the character pattern framing means;

length information detecting means for detecting the continuous digital signal train included in each of the four peripheral information units to code the digital signal train into a length information code;

a storage section for storing a plurality of character groups each including a plurality of different characters;

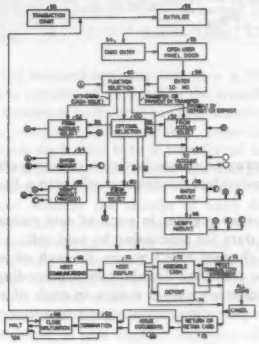
an address selection circuit addressing a corresponding character group to the character being recognized from the storage section in accordance with the four length information codes corresponding to the four peripheral information units; and

recognizing means for recognizing the character being recognized from a plurality of different characters included in the detected character groups.

3,970,992
TRANSACTION TERMINAL WITH UNLIMITED RANGE OF FUNCTIONS

William A. Boothroyd, and Boyd W. Sorensen, both of San Jose, Calif., assignors to IBM Corporation, Armonk, N.Y.

Filed June 25, 1974, Ser. No. 483,058
Int. Cl.² G06K 7/01; H04Q 5/00
U.S. Cl. 340—172.5 **20 Claims**



1. A transaction execution terminal comprising:

a car handling subsystem which receives cards and reads information stored on received cards under control of a control subsystem;

a selectively variable display operating under control of a control subsystem and displaying information commanded by a control subsystem;

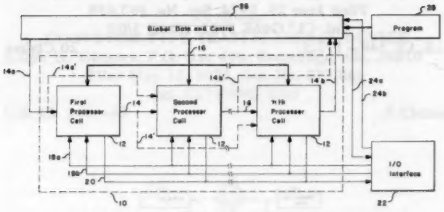
a user keyboard having keys arranged in a plurality of keyboard fields with each keyboard field being related to a predetermined category of user transaction request information and including a plurality of keys each defining different mutually exclusive information states for the cetegory of user transaction request information to which the field relates, one key within at least one field being a variable information state key, the activation of which indicates that the information state indicated thereby is to be determined by a combination of at least one subsequent keyboard key activation in conjunction with a predeteremined schecule correlating key activation combinations with information states; and

a control subsystem which controls the operation of the card handling subsystem and receives account card information therefrom, which commands the display of information on the variable display to aid a terminal user in the use of the terminal, and which receives keyboard key activtion information in a predetermined sequence requiring one information state indication from each of a plurality of successive keyboard fields.

3,970,993
COOPERATIVE-WORD LINEAR ARRAY PARALLEL PROCESSOR

Charles A. Finnila, Los Angeles, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Jan. 2, 1974, Ser. No. 430,304
Int. Cl.² G06F *15/16*
U.S. Cl. 340—172.5 **17 Claims**



1. In an array processor having a chaining channel for connection of individual processing cells into a linear processing array:

a data storage register in each of said processing cells for storing data for processing by said cell;

chaining channel input means in each of said processing cells for receiving signals from a preceding cell;

chaining channel output means in each of said processing cells for providing output signals to a succeeding processing cell;

control source for generating a plurality of control signals;

a plurality of flag flip-flops in each of said processing cells for storing flag data in response to said control source, said flag data including data representative of three mutually exclusive data transfer operations;

first gating means in each of said cells coupling said chaining channel input means and said chaining channel output means, said first gating means for decoding said flag data representative of said first data transfer operation and for enabling said cell to transfer data from said chaining channel input means to said chaining channel output means in response to a first control signal from said control souce;

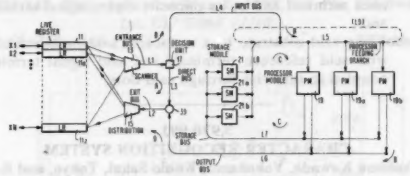
second gating means in each of said processing cells coupling said chaining channel input means, said data storage register and said chaining channel output means, said second gating means for decoding said flag data representative of said second data transfer operation and for enabling said cell to transfer data simultaneously from said chaining channel input means to said data storage register and for enabling data transfer from said data storage register to said chaining channel output means in response to said first control signal from said control source; and

third gating means in each of said processing cells coupling said chaining channel input means, said first flag flip-flops and said chaining channel output means, said third gating means for decoding said flag data representative of said third data transfer operation and for enabling said cell to transfer data from said chaining channel input means to said first flag flip-flop and for enabling data transfer from said first flag flip-flop to said chaining channel output means in response to said first control signal from said control source.

3,970,994
COMMUNICATION SWITCHING SYSTEM

Christian Jakob Jenny, Thalwil, Switzerland, assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Feb. 28, 1974, Ser. No. 447,177
Claims priority, application Switzerland, Mar. 21, 1973, 4095/73
Int. Cl.² G06F *15/16*; H04J *3/02*; H04Q *3/42, 3/64*
U.S. Cl. 340—172.5 **11 Claims**



1. A modular communication switching system with distributive controls for frame processing comprising:

a plurality of line registers each having the capacity to store at least one frame, each of said line registers being associated with a particular communication line to be connected;

a scanning means connected to said line registers for sequentially extracting frames from said line registers and transferring said frames to an entrance bus;

a decision means connected to said entrance bus for transferring said frames to an input bus depending on the value of a particular indicator bit in said frames, said input bus being connected to a processor feeding bus;

a plurality of identical processor modules connected in parallel to said processor feeding bus enabling said frames to sequentially interrogate the inputs of said processor modules, each module accepting one of said frames for processing when said processor module does not contain a frame, and after processing, transferring a processed frame to an output bus;

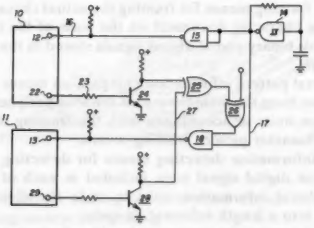
interfacing means connected to said output bus for transferring said frame from said output bus to an exit bus; and

a distributor means connected to said exit bus for sequentially forwarding said frames back to said line registers for distribution to said communication lines.

3,970,995
SLAVING CALCULATOR CHIPS

Daniel Adrian Baudouin, Houston, Tex., and John R. Dumas, Tempe, Ariz., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Feb. 27, 1974, Ser. No. 446,176
Int. Cl.² G06F *11/00*
U.S. Cl. 340—172.5 **7 Claims**



1. In an electronic system implemented on semiconductor chips where it is desired to operate in synchronism more than one chip in the system where at least one element common to

the operation of both or all chips is responsive to sequentially generated operating states, the combination which comprises:

a master clock for applying clock pulses to the clock input terminals of said chips,

means connected to selected operating state output terminals from both or all of said chips for inhibiting flow of clock signals to one of the chips so long as said selected operating states differ.

3,970,996

APPARATUS FOR COLLECTING MEDICAL DATA

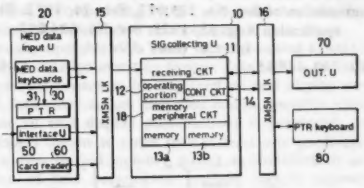
Toshio Yasaka; Ryuzo Ito, and Sadao Takagi, all of Tondabayashi, Japan, assignors to Perfect Liberty, Japan

Filed Jan. 7, 1974, Ser. No. 431,232

Claims priority, application Japan, Feb. 28, 1973, 48-23233

Int. Cl.² G06F *3/02, 3/04, 3/12*

U.S. Cl. 340—172.5 **3 Claims**



1. Apparatus for collecting medical data comprising,

a plurality of medical data input units each including a medical data keyboard with keys that can be set to establish desired medical tests, each of said input units including an identification card reader for receiving a patient identification means and including locking means for holding said identification means until a release signal is received,

a plurality of patient test stations electrically connected to each of said medical data input unit to collect medical data from the patient whose identification means has been placed into said card reader,

a central signal collecting and processing unit including a receiving circuit electrically connected to each of said plurality of medical data input units and including an identification register electrically connected to each of said identification card readers of said input units,

a data comparison circuit connected to said identification register and comparing the information from said patient identification means with the desired patients identification and electrically connected to said input units to produce an enable signal or an identification error signal,

an error indicator at each of said input units connected to said data comparison circuit,

a control circuit in said processing unit connected to said receiving circuit,

a plurality of memory cells in said processing unit and connected to said control circuit and said receiving circuit so as to store medical test data from said patient test stations,

an end of test signal generator in said processing unit connected to said medical data input units and supplying an electrical signal to said card reader locking means to release said identification means at the end of medical tests,

data output means connected to said processing means, and

said control circuit connecting said memory cells to said output means to supply medical and identification data thereto which is reproduced by said output means.

3,970,997

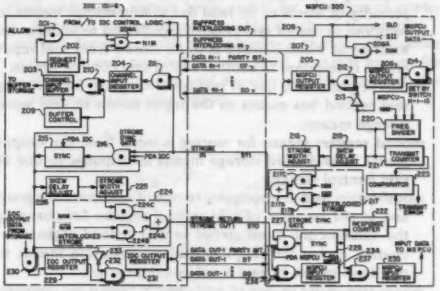
HIGH SPEED PERIPHERAL SYSTEM INTERFACE

Robert M. Daly, Westford; John E. Mekota, Jr., Belmont, and Gary J. Goss, Acton, all of Mass., assignors to Honeywell Information Systems, Inc., Waltham, Mass.

Filed Aug. 29, 1974, Ser. No. 501,583

Int. Cl.² G06F *3/00*

U.S. Cl. 340—172.5 **16 Claims**



1. An improved demand response interface in which a data processing unit is capable of demanding the transfer of information up to a maximum asynchronous byte transfer rate from another unit by energizing a demand line connecting the two units and in which each data byte is transferred to said data processing unit in synchronization with the energization of a response line connecting the two units and energizable by said another unit and wherein the receipt of each data byte is signalled by said data processing unit by de-energizing said demand line, said interface further including apparatus for enabling said interface for exceeding said maximum asynchronous byte transfer rate, said apparatus comprising:

at least first and second control lines connecting said data processing unit and said another unit;

first means included in said another unit and connected to said first line, to said demand line and to said response line, said first means including means for generating a first control signal on said first control line requesting that data bytes are to be transferred at a rate greater than said maximum asynchronous rate;

second means included in said data processing unit and connected to said second lines, to said response line and to said demand line, said second means being responsive to said first control signal to generate a second control signal on said second control line signalling allowance of byte transfer at said rate greater than said maximum asynchronous rate; and,

enabling means included in each of said units and connected to said first and second control lines and to said first and second means, each said enabling means being jointly responsive to said first and second signals for generating a signal enabling said first and second means of said units to transfer data bytes across said interface at said rate greater than said maximum asynchronous rate by applying signals to said demand and response lines.

3,970,998

MICROPROCESSOR ARCHITECTURE

Joseph A. Weisbecker, Cherry Hill, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Oct. 15, 1974, Ser. No. 514,937

Int. Cl.² G06F *15/20*

U.S. Cl. 340—172.5 **4 Claims**

1. A microprocessor architecture comprising, in combination:

first bus means for providing external device addresses;

second bus means for providing data signals to, and accepting data signals from external devices;

first register means for receiving and storing a control word from the second bus;

control means responsive to the word stored in said first register means for providing a sequence of control signals to execute a predetermined operation indicated by the word in said first register means;

word storage means for storing a plurality of words, including input means, output means, and decoding means for decoding a plurality of signals to address one of said plurality of words to be read out to said output means in response to one of said control signals and to address the location at which a word is to be stored from said input means in response to another one of said control signals;

means responsive to one of said control signals for coupling said second bus means to the input means of said word storage means;

second register means for storing a word from the output means of said word storage means in response to one of said control signals;

modification means responsive to one of said control signals and to the contents of said second register for changing the value of the word stored in said second register including means for coupling said modification means to the input means of said word storage means;

means responsive to one of said control signals for coupling said second register means to said first bus means;

third, fourth, and fifth register means, each having input means and output means, coupled to receive signals from said second bus means for selectively supplying said plurality of signals to the decoding means of said word storage means in response to one of said control signals;

sixth register means responsive to one of said control signals for receiving and storing the contents of said third and fourth register means;

means responsive to one of said control signals for coupling said sixth register means to said second bus means; and

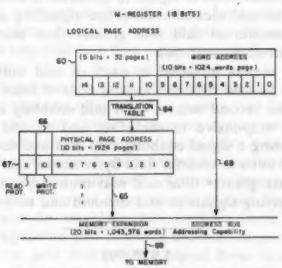
means responsive to one of said control signals for coupling the output means of said fifth register means to said second bus means.

3,970,999

MEMORY EXPANSION APPARATUS

John S. Elward, San Jose, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Mar. 24, 1975, Ser. No. 561,470
Int. Cl.² G06F 9/20
U.S. Cl. 340—172.5 11 Claims



1. An apparatus for translating a logical memory address, each having a logical page address portion and a word address portion, from a central processing unit into a physical memory address, having a physical page address portion and the word address portion, said apparatus comprising:

a plurality of translating means having enabled and disabled states for providing the physical page address portion of the physical memory address in response to the logical page address portion of the logical memory address; and

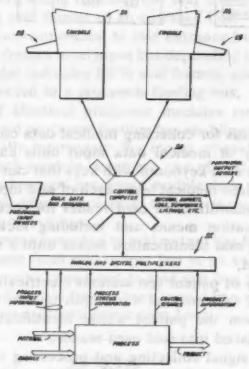
an enabling and addressing circuit coupled to the central processing unit for receiving command signals and the logical page address portion of the logical memory address therefrom, and coupled to the translating means for providing control signals and the logical page address portion of the logical memory address thereto, said enabling and addressing circuit including a state circuit for storing electrical signals representing the present state of said translating means whenever that state is altered to a new state by said command signals, said electrical signals being useful for subsequently restoring the translating means to the present state.

3,971,000

COMPUTER-DIRECTED PROCESS CONTROL SYSTEM WITH INTERACTIVE DISPLAY FUNCTIONS

Nicholas O. Cromwell, Sharon, Mass., assignor to The Foxboro Company, Foxboro, Mass.

Continuation of Ser. No. 481,180, June 20, 1974, which is a continuation of Ser. No. 419,444, Nov. 27, 1973, which is a continuation of Ser. No. 229,077, Feb. 24, 1972. This application Aug. 13, 1975, Ser. No. 604,092
Int. Cl.² G06F 3/14
U.S. Cl. 340—172.5 11 Claims



1. In an industrial process instrumentation system for use with complex processes having a number of variable process conditions such as temperature, flow rate, and the like, said system comprising:

data processor means arranged to receive signals representing the values of various process conditions, said processor means having data storage means with processor control data stored therein comprising programs and operational base data such as set-point values for performing sequential computations respecting said process conditions so as to produce corresponding output signals for use in controlling the process;

an operating console;

signal transmission means coupling said console to said data processor means to transmit signals thereto and receive signals therefrom;

display means forming part of said console for producing visual images in the form of symbols for inspection by an operator;

memory means storing data signals for controlling said display means, said memory means having a plurality of separate storage locations each adapted to store data signals for establishing the symbolic image in a corresponding position of said display means;

said storage means of said data processor means having data stored therein representing a plurality of sets of display data words to be transmitted over said signal transmission means to said memory means for storage therein to control said display means with each of said sets of display data words defining a respective display presentation symbolically presenting the present status of selected portions of said processor control data respecting at least one corresponding process condition for which computations are being performed by said data processor means and including as part of said presentation preselected symbols identifying display positions where characters may selectively be entered;

memory write in means responsive to said sets of display words received over said transmission means from said data processor means to store in said memory means data signals identifying the selected symbols to be displayed on said display means and stored in memory means storage locations corresponding to display positions where the symbols are to be displayed, thereby to present on said display means for operator inspection the display presentation corresponding to the selected set of display data words transmitted to said console;

manually-operable data entry means coupled to said memory means for inserting therein data signals representing symbols desired to be displayed on said display means;

said data entry means including means operable while any one of said display presentations is presented on said display means to enter into at least one predetermined location in said memory means as identified by at least one of said preselected symbols signals representing changed data for at least a part of said processor control data respecting a particular condition of said process about which information is then presented on said display means responsive to the set of display words received by said memory means from said data processor means, said entered data signal serving to develop a corresponding symbol on said display in a position corresponding to said predetermined location; and

manually-controllable read out means coupled to said memory means to direct said changed data signals entered by said data entry means into said predetermined location of said memory means to said transmission means for transmittal on to said data processor means to alter correspondingly said processor control data for said particular process condition thereby to alter correspondingly the subsequent computations respecting said particular condition, whereby the processing carried out by said processor means is readily controllable by data inserted by an operator into selected locations of said memory means as determined by symbolic information presented on said display means by signals from said central data processor.

3,971,001

REPROGRAMMABLE READ ONLY VARIABLE THRESHOLD TRANSISTOR MEMORY WITH ISOLATED ADDRESSING BUFFER

Robert J. Lodi, Tewksbury, Mass., assignor to Sperry Rand Corporation, New York, N.Y.

Filed June 10, 1974, Ser. No. 477,723

Int. Cl.² G11C *5/06, 11/40*

U.S. Cl. 340—173 R **9 Claims**

1. A digital memory comprising

semiconductor substrate means,

an array of variable threshold field effect transistors formed on said substrate means,

each said variable threshold transistor having a source and a drain formed in said substrate means with a gate electrode therebetween insulated from said substrate means,

each said variable threshold transistor having a first conduction threshold established by applying a clearing potential to said gate electrode with respect to said substrate means and a second conduction threshold established by applying a writing potential to said gate electrode with respect to said substrate means, said clearing and writing potentials being of opposite polarity with respect to each other,

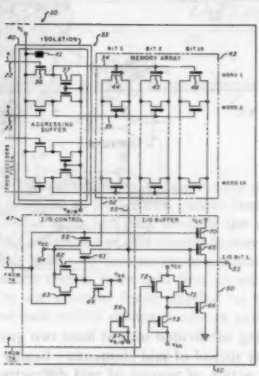
first terminal means for applying said clearing potential to said memory,

second terminal means for applying said writing potential to said memory,

third terminal means for applying addressing signals to said memory,

said addressing signals being coded for selection of predetermined groups of said variable threshold transistors,

address decoder circuit means having a plurality of decoder outputs and coupled to said third terminal means for selectively energizing said decoder outputs in accordance with said addressing signals,



address buffer circuit means coupled to said decoder outputs and including fixed threshold transistors coupling said first and second terminal means to said gate electrodes of said variable threshold transistors,

said fixed threshold transistors being formed in said substrate means whereby one of said clearing and writing potentials is of a polarity to be coupled to said substrate means through forward biased junctions of said fixed threshold transistors, and

isolation means surrounding said addressing buffer circuit means for electrically isolating the portion of said substrate means associated with said address buffer circuit means from the remainder of said substrate means whereby both said clearing and writing potentials can be established between said gate electrodes of said variable threshold transistors and said substrate means associated therewith.

3,971,002

DEVICE FOR THE OPTICAL READ-OUT OF A DIFFRACTIVE TRACK BELONGING TO A DATA CARRIER IN THE FORM OF A DISC OR TAPE

Claude Bricot, and Jean Claude Lehureau, both of Paris, France, assignors to Thomson-Brandt, Paris, France

Filed June 26, 1974, Ser. No. 483,433

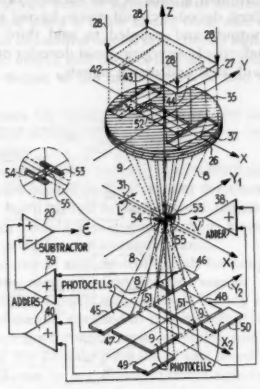
Claims priority, application France, June 29, 1973, 73.24004

Int. Cl.² G11C *7/00, 13/04;* **G11B** *21/10*

U.S. Cl. 340—173 LT **14 Claims**

1. An optical read-out device for the read-out of a data-carrier having a read-out surface wherein is formed a succession of diffractive elements building up a track of predetermined width, said optical read-out device including an optical read-out assembly comprising: a source of radiant energy for illuminating said read-out surface, optical projection means arranged between said source and said data-carrier for concen-

trating said radiant energy upon said read-out surface, and photoelectric means arranged for collecting radiant energy emerging from the portion of said read-out surface illuminated by said source; said optical projection means forming at said read-out surface two collateral read-out spots respectively formed by elementary beams supplied from said optical projection means; said read-out spots being aligned along an axis intersecting the longitudinal axis of said track for scanning said surface during the course of read-out over a width interval greater than said predetermined width; said photoelectric



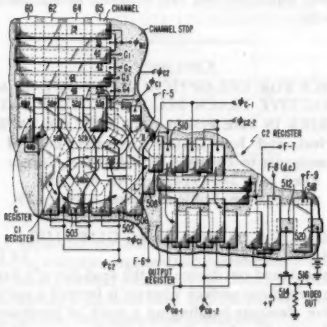
means being subdivided into at least two groups respectively sensing any spread of said elementary beams arising from the scattering action of anyone of said diffractive elements; said photoelectric means being associated with subtractor means having two inputs respectively coupled to said groups; said optical projection means comprising lens means for focussing said radiant energy upon said read out surface and refringent means with plane major faces for imparting to at least one of said elementary beams a deviation separating said read out spots from one another in said read out surface.

3,971,003

CHARGE COUPLED DEVICE IMAGER

Walter Frank Kosonocky, Skillman, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Nov. 18, 1974, Ser. No. 524,829
Int. Cl.² G11C *11/40*
U.S. Cl. 340—173 R **8 Claims**



1. In a charge coupled imager having A and B registers with M channels extending in the column direction, and a C register which includes M charge storage sites generally aligned with said M channels, respectively, said register operated by a N phase voltage, the improvement comprising:

means coupling each channel of the B register to a different storage site in said C register, said means including during one portion of a row time, means for shifting 1/N'th of a row of charge signals into 1/N'th of said storage sites in said C register and during each following portion of the same row time, means for shifting 1/N'th of the remaining charge signals of said row into a different 1/N'th of said storage sites in said C register, until N/N parts of the row have been transferred;

means for reading out said C register comprising means for reading from the C register the one of the charge signals transferred from one of the 1/N'th parts of the row which is the first in position in that 1/N'th of a row followed by the first in position of the charge signals transferred from another 1/N'th part of the row, and so on until all N of the first in position charge signals have been read out, and for continuing the same process for the second through the M/N'th in position charge signals, until all NM/N = M charge signals have been read from the C register, whereby the row of charge signals read from the B to the C register is reconstructed during the readout of the C register; and

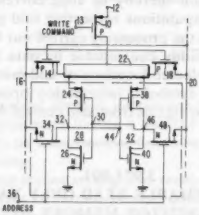
said means for shifting including electrode means between the last row of the B register and the C register, said electrode means comprising storage electrode means for temporarily storing the entire row of charge signals, and transfer electrode means for transferring during spaced time intervals, 1/N'th of said row from said storage electrode means to said C register and for providing a potential barrier between the remaining charge, if any, stored beneath said storage electrode means and said C register during the periods between said spaced time intervals.

3,971,004

MEMORY CELL WITH DECOUPLED SUPPLY VOLTAGE WHILE WRITING

Andrew Gordon Francis Dingwall, Somerville, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Mar. 13, 1975, Ser. No. 558,145
Int. Cl.² G11C *7/00, 11/42*
U.S. Cl. 340—173 FF **12 Claims**



8. Memory means having read and write modes comprising, in combination:

a terminal for a voltage at a given level;

a bus;

switch means connected between said bus and said terminal for connecting said bus to said terminal during said read mode;

a memory cell having first and second states connected between said bus and a point of reference potential, said cell, when in said first state, exhibiting a low impedance between said bus and a first node of the cell and when in said second state, exhibiting a high impedance between said bus and node;

means for writing information into said cell thereby switching the cell from its first to its second state comprising means for connecting said first node through a first path

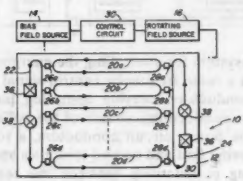
having an impedance which is much higher than said low impedance and much lower than said high impedance to said point of reference potential and means for concurrently opening said switch means, whereby the voltage on said bus drops towards the reference potential level, said cell switching to said second state when the voltage on said bus reduces to a particular value; and

means for automatically supplying a voltage having a given level to said bus after the cell has switched state comprising a path between said bus and a point at a given voltage level, said path having an impedance which is much higher than that of said first path and which is much lower than the impedance of said cell between said bus and said point of reference potential when said cell has assumed either said first or said second state.

3,971,005
DUAL ACCESS MAGNETIC DOMAIN MEMORY

Carl F. Buhrer, Framingham, Mass., assignor to GTE Laboratories Incorporated, Waltham, Mass.

Filed Jan. 17, 1975, Ser. No. 541,898
Int. Cl.² G11C *11/14, 19/00*
U.S. Cl. 340—174 TF **8 Claims**



1. A cylindrical magnetic domain memory, comprising:

a. a domain sustaining platelet and bias magnetic field means for creating stable cylindrical magnetic domains in the platelet,

b. a domain propagation structure including a propagation track made of a layer of magnetic elements of a desired pattern and rotating magnetic field means for creating unidirectional motion of the domains along the track, the propagation track including a plurality of closed minor loops of equal domain capacity and first and second closed major loops of equal domain capacity,

the major loops having a domain bit length selected to accommodate a predetermined number of bits from each of the minor loops,

c. first and second transfer switch means connecting each minor loop to the first and second major loops respectively for transferring domains between the major and minor loops,

the length of the minor loops and the major loops and domain switch means being selected to provide domain position synchronization between the minor loops and each major loop for each full domain circulation around the major loop and

d. a domain detector, generator and annihilator disposed in each major loop.

3,971,006
MULTI DIRECTIONAL MOTION AND VIBRATION TRIGGERING DEVICE

Palmer W. Pressly, Jr., 111 N. Burlingame Ave., Temple Terrace, Fla. 33617

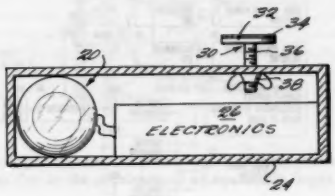
Filed June 24, 1975, Ser. No. 590,011
Int. Cl.² G08B *13/08*
U.S. Cl. 340—224 **6 Claims**

1. A motion detector for producing a motion signal comprising:

switch means for producing said motion signal when shifted from a first to a second orientation with respect to a horizontal plane,

case means defining an interior space in which said switch means is mounted in a position fixed with respect to said case means

means mounted within said casing and connected to said switch means for transmitting a signal when said motion signal is produced and

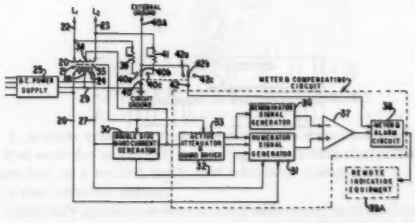


means for pivotably mounting said case means to a fixed planer surface about an axis which passes through said interior space but does not pass through the center of gravity of said case means so that pivotable movement of said case means shifts said case means to a position which shifts said switch means from said first to said second orientation by an external force applied to said case means so that said switch means produces said motion signal.

3,971,007
LINE ISOLATION MONITOR

Henry S. Borkovitz, Skokie, and Wesley G. Peterson, Mount Prospect, both of Ill., assignors to Sola Basic Industries, Inc., Milwaukee, Wis.

Continuation of Ser. No. 364,860, May 29, 1973. This application Mar. 27, 1975, Ser. No. 562,767
Int. Cl.² G08B *21/00*
U.S. Cl. 340—255 **6 Claims**

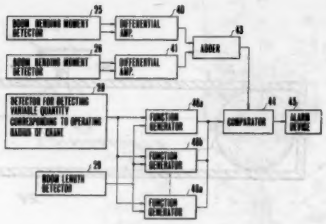


1. A line isolation monitor for sensing hazard current, said monitor being connected to power lines isolated from ground having a predetermined power line frequency, said monitor comprising a current generator for generating a first electrical signal, first means for applying said first electrical signal between said isolated power lines and ground, and means connected to said first means for generating a second electrical signal related to the phase angle of said sensed first electrical signal with reference to the power line and related to the amplitude of said sensed first electrical signal, wherein said second signal is proportional to the hazard current.

3,971,008
CRANE OVERLOAD DETECTOR USING A BOOM BENDING MOMENT DETECTOR

Hiroshi Nishizaki; Kanji Yonekura, both of Tamano, and Yuichi Tsuji, Tokyo, all of Japan, assignors to Mitsui Shipbuilding and Engineering Co., Ltd., Tokyo, Japan

Filed Mar. 4, 1975, Ser. No. 555,179
Claims priority, application Japan, Mar. 5, 1974, 49-25254
Int. Cl.² G08B 21/00
U.S. Cl. 340—267 C 10 Claims

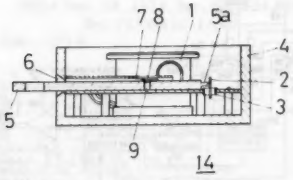


1. Apparatus for detecting overload of a crane having a boom for hanging loads, comprising a boom bending moment set value generator which is determined by a variable quantity corresponding to the operating radius of the crane, a pair of boom bending moment detectors mounted on said boom at two points spaced transversely symmetrical to a plane containing a longitudinal axis of said boom, means for producing a mean value of the outputs of said two detectors, a comparator for comparing the output of said boom bending moment set value generator with said mean value, and means operated by the output of said comparator which is produced when said mean value exceeds the output of said boom bending moment set value generator.

3,971,009
KEY RELEASE TYPE BURGLAR ALARM

Akinobu Fujiwara, No. 593-38, Naganuma-cho, Hachioji, Tokyo, Japan

Filed Jan. 31, 1975, Ser. No. 546,122
Claims priority, application Japan, Sept. 17, 1974, 49-111859[U]
Int. Cl.² G08B 13/00
U.S. Cl. 340—276 4 Claims



1. An electrical switching device for use in an alarm system circuit, said device comprising:

ring-like cylindrical element of electrically conductive material electrically connected to said alarm circuit;

contact means of electrically conductive material fitted through said cylindrical element and electrically connected to said alarm circuit for resiliently contacting the inside surface of said cylindrical element and forming a completed alarm circuit;

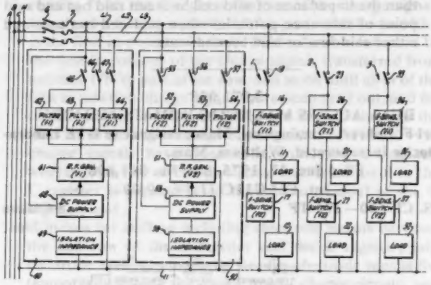
a key removably positioned against said contact means for forcing said contact means away from said inside surface of said cylindrical element and breaking said completed alarm circuit; and

retainer means adjacent said key for retaining said key in a predetermined position against said contact means, whereby the alarm circuit is held open.

3,971,010
BALLASTED LOAD CONTROL SYSTEM AND METHOD

Robert C. Foehn, Novato, Calif., assignor to FF & L Industries Inc., South San Francisco, Calif.

Filed May 28, 1974, Ser. No. 473,744
Int. Cl.² H04Q 9/00
U.S. Cl. 340—310 R 7 Claims

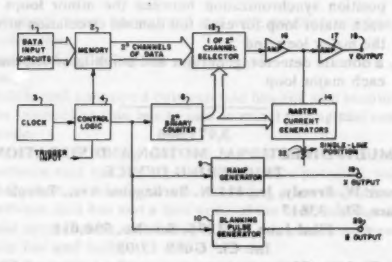


1. In a system for controlling the energization of a ballasted load with a radio frequency control signal imposed on power circuit conductors carrying operating power for the load: means for connecting one side of the ballasted load to a first one of the power circuit conductors, a solid state switching device having first and second terminals and a control gate for controlling conductivity between the terminals, means for connecting the first and second terminals of the switching device respectively to a second side of the ballasted load and to a second one of the power circuit conductors, an impedance element connected between the control gate and the second terminal of the switching device, a series resonant circuit adapted to pass the control signal and block the operating power, and means for connecting the resonant circuit between the control gate of the switching device and the first power circuit conductor whereby the radio frequency control signal is developed across the impedance element and applied to the gate of the switching device to actuate the same.

3,971,011
MULTIPLE-LINE DISPLAY SIGNAL GENERATING APPARATUS HAVING A SINGLE LINE POSITION CONTROL

Marshall Bond Borchert, Aloha, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Aug. 7, 1975, Ser. No. 602,630
Int. Cl.² G08B 5/36; G06F 3/14
U.S. Cl. 340—324 A 11 Claims



1. A display signal generating apparatus, comprising:

programming means for producing program logic in a predetermined manner;

programmable current generator means responsive to said program logic for sequentially producing a plurality of current steps having different fixed magnitudes;

variable current generator means for producing current having a variable magnitude;

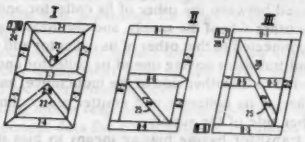
control circuit means for substituting said variable current for a selectable one of said fixed current steps; and

output circuit means including current to voltage conversion means responsive to said fixed and variable currents for producing a voltage signal having a plurality of fixed voltage steps and a single variable step to be applied to the vertical axis of a display device.

3,971,012
DISPLAY DEVICE EMPLOYING SPECIAL-PURPOSE MONOGRAMS

Shigeru Morokawa; Katsuo Nishimura, and Yasushi Nomura, all of Tokorozawa, Japan, assignors to Citizen Watch Co., Ltd., Tokyo, Japan

Filed Feb. 25, 1974, Ser. No. 445,625
Claims priority, application Japan, June 18, 1973, 48-68438
Int. Cl.² G09F 9/32
U.S. Cl. 340—336 **3 Claims**



1. A device for displaying at least the initials of the days of the week, comprising:

a first array of electrically controllable elongate display elements selectively energizable in different combinations corresponding to the first letter of any day of the week; and

a second array of electrically controllable elongate display elements selectively energizable in different combinations corresponding to the second letter of any day of the week;

said elements of said first and said second arrays including six linear elements forming an oblong substantially upright frame and a seventh linear element extending horizontally across said frame to divide same into an upper and a lower half, said first array further including two V-shaped elements disposed in said halves in mutually inverted relationship with vertices pointing toward said seventh element, said second array further including an eighth linear element extending obliquely from upper left to lower right within said lower half.

3,971,013
TOUCH KEYBOARD

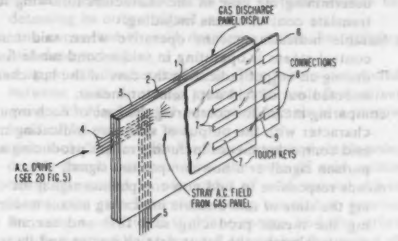
Francis Loyola Challoner, Chandlers Ford, England, and Hemmige Desikachar Varadarajan, Wappingers Falls, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 23, 1975, Ser. No. 570,990
Claims priority, application United Kingdom, Oct. 1, 1974, 42541/74
Int. Cl.² G08C 1/00
U.S. Cl. 340—337 **10 Claims**

1. A touch operated keyboard comprising:

an AC driven gas discharge panel display;

at least one conductive touch key located proximate said display to pick up an AC voltage from said stray field generated by the gas discharge panel; and

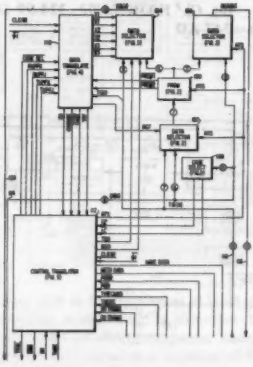


means to detect the drop in AC voltage level of said at least one key due to the proximity of an operator's finger.

3,971,014
BI-DIRECTIONAL TRANSLATOR

Simon Korowitz, Hatfield, Pa., assignor to Sperry Rand Corporation, New York, N.Y.

Filed Oct. 7, 1974, Ser. No. 512,921
Int. Cl.² G06F 3/00
U.S. Cl. 340—347 DD **22 Claims**



1. A code translator responsive to input data characters in a first code for selectively producing output data characters in said first or a second code, said translator comprising:

a data selector means;

read only memory means having addressing inputs responsive to said input data characters and outputs connected to said data selector means, said memory means having stored therein data characters in said second code at addresses addressable by data characters in said first code, whereby each data character read out of said memory means is the translation in said second code of the addressing character;

means for applying the input data characters to said data selector means and the inputs of said memory means;

translate control means operating in a first or a second mode and including means to produce a first or a second select signal, respectively; and,

means for applying said first or said second select signal to said data selector means to select as the output therefrom

either the data character in said first code or the translation of said data character in said second code;

each character in said first code including a binary bit representing the case of that character and said second code including two case characters with each case character determining the case of the characters following it, said translate control means including:

bistable indicating means operative when said translate control means is operating in said second mode for producing an output indicating the case of the last character selected out of said data selector means;

comparing means for comparing the case of each input data character with the output of said case indicating means, said comparing means including means producing a comparison signal or a non-comparison signal;

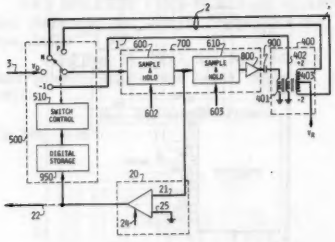
means responsive to said non-comparison signal for changing the state of said bistable indicating means and inhibiting the means producing said first and second select signals whereby the input data character and its translation are both blocked by said data selector means:

means responsive to the absence of both said select signals and the output of said bistable indicating means for forcing said data selector means to produce, in said second code, output signals representing a case character, said case character being the same case as that represented by the changed state of said bistable indicating means.

3,971,015
RECIRCULATING TYPE ANALOG TO DIGITAL CONVERTER

Thomas Hornak, Los Altos, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Feb. 10, 1975, Ser. No. 548,315
Int. Cl.² H03K *13/02*; 324 *99 D*
U.S. Cl. 340—347 AD **27 Claims**



1. An analog to digital converter comprising:

a time delay having an input and an output;

algorithmic means having an input for generating a first and second signal, the first signal being an inverse of a signal appearing at the time delay input and the second signal being a selected function of the time delay input signal corresponding to a desired conversion of an applied analog signal;

switch means for coupling the time delay input to receive the applied analog signal and for repetitively coupling the time delay input to receive the first and second signals;

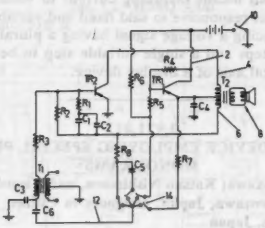
means for coupling the time delay output to the algorithmic means input; and

comparator means coupled to the time delay for producing a digital output signal.

3,971,016
ELECTRONIC CHIRPER

Fong Pui, Kennedy Town, Hong Kong, assignor to Playart Ltd., Hong Kong

Filed Mar. 3, 1975, Ser. No. 554,766
Claims priority, application United Kingdom, Apr. 22, 1974, 17597/74
Int. Cl.² G08B *3/10*
U.S. Cl. 340—384 E **8 Claims**



1. An audio frequency signal generating circuit for producing repeated tones comprising

a pair of transistors,

the first transistor having one of its collector and emitter connected to a voltage supply line, having a capacitor connected between the other of its collector and emitter and the other side of the supply, and also having an inductance connected to that other of its collector and emitter,

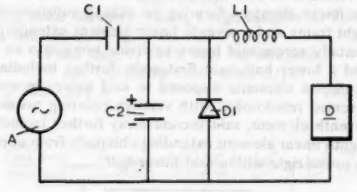
the second transistor having one of its collector and emitter connected to the other side of the inductance, and having the other of its collector and emitter also connected to the other side of the supply,

the first transistor having biasing means to bias it into an operating condition and the second transistor being arranged with reactive feedback to cause oscillation.

3,971,017
METHOD AND APPARATUS FOR EXCITING THE DRIVING COILS OF AUDIBLE WARNING DEVICES

Henry Sutcliffe, Worsley, and Edward Ball, Chadderton, both of England, assignors to Penelopegay Rowland Absalom, Great Missenden, England

Filed Apr. 30, 1975, Ser. No. 573,229
Int. Cl.² G08B *3/00*
U.S. Cl. 340—384 E **5 Claims**



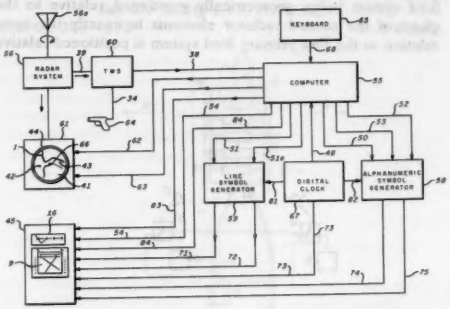
1. A circuit arrangement means for exciting an audible device, comprising first and second capacitor means, the effective capacitance of the two means being in series for connection across an alternating current mains supply, said second capacitor means having connected across it a rectifier and also the series combination of an electronic voltage sensitive switch and the operaing means of the warning device, the arrangement being such that, in operation, the charge on the second capacitor means is periodically discharged through said operating means.

3,971,018

MARINE TRAFFIC CONFLICT ASSESSMENT SYSTEM

Eric J. Isbister, Greenlawn, and James P. O'Sullivan, Sea Cliff, both of N.Y., assignors to Sperry Rand Corporation, New York, N.Y.

Filed June 24, 1974, Ser. No. 483,182
Int. Cl.² G01S 9/02
U.S. Cl. 343—5 CD 13 Claims



1. Apparatus for the predictive display of the navigation characteristics of craft relative to at least first and second way points of a confined navigation channel with respect to time, at least one of said way points being characterized as a locality within which it is hazardous for craft to pass one another, comprising:

fixed location sensor means for generating coordinate and velocity component data of craft with respect to said fixed location sensor means,

computing means responsive to said coordinate and velocity component data for computing the predicted distance of travel of at least a first of said craft along said confined navigation channel with respect to said way points at a predetermined future time, and

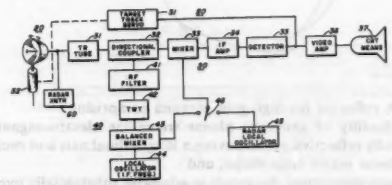
display means responsive to said computing means for displaying, in distance of travel and time coordinates, the present and predicted distance of travel and the corresponding present and future time coordinates of said first craft as first and second time-distance points on said display.

3,971,019

RECEIVER APPARATUS

William H. Rymes, Center Ossipee, N.H. 03864

Filed June 14, 1973, Ser. No. 370,139
Int. Cl.² G01S 3/38, 9/02
U.S. Cl. 343—7.4 1 Claim



1. Apparatus for processing an electromagnetic signal of unknown frequency comprising, in combination:

means for receiving said signal;

directing means for directing said signal into two channels;

first channel means comprising local oscillator means set at a predetermined IF frequency, and first mixer means receiving as inputs the output of said local oscillator means and the output of said directing means; and

second channel means comprising

second mixer means receiving as inputs the outputs of said first mixer means and said directing means,

means connected to said second mixer means for amplifying signals of the IF frequency,

detection means connected to said amplifier means for detecting its output signal, and

means connected to said detecting means for utilizing said detected signal,

said apparatus further including filter means connected between said directing means and said first mixer means for blocking the passage of signals in a narrow band of frequencies, and

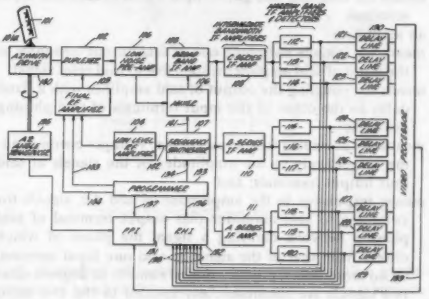
further including a radar local oscillator and single-pole, double-throw switch means, the pole of said switch being connected to one input of said second mixer means, one switch terminal being coupled to receive the output of said first mixer means and the other switch terminal being coupled to receive the output of said radar local oscillator, so that either the first mixer means or the radar local oscillator may be coupled to said second mixer means at any given time.

3,971,020

THREE DIMENSIONAL RADAR SYSTEM WITH INTEGRATED PPI PRESENTATION

Shirly Lavar Howard, Rolling Hills Estates, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Dec. 2, 1966, Ser. No. 599,348
Int. Cl.² G01S 7/20, 7/28, 9/02
U.S. Cl. 343—7.9 10 Claims



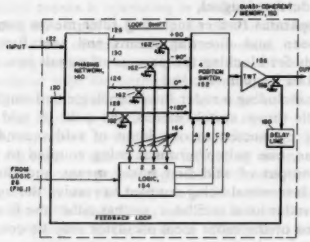
2. A pulsed radar system for displaying at least plan position indicator information, comprising: a directive antenna for radiating a pencil beam of electromagnetic energy which is directable in the elevation plane as a function of frequency of excitation and which is directable at a relatively slower rate in the azimuth plane in response to separate azimuth scan means; means for cyclically exciting said antenna with pulses of high frequency electrical energy, said pulses each comprising a plurality of successive bursts each beginning with a different first frequency which is modified progressively with each of said bursts throughout each of said pulses to produce a series of multi-beam groups each covering a corresponding sector in the vertical plane with at least some angular overlap of the beams within said multi-beam groups; means operative to permit reception of echo signals between said transmitted pulses in the same angle versus frequency relationship as transmitted through said antenna to produce a plurality of separate output signals; delay means responsive to said separate output signals to produce time correspondence of said separate output signals; and summation means for algebraically summing said delayed separate output signals over each interval of reception to produce a composite signal, thereby to provide an improved signal-to-noise ratio in said composite signal.

3,971,021

COHERENT FREQUENCY MEMORY

Alfred J. Cann, Wilton, N.H., assignor to Sanders Associates, Inc., South Nashua, N.H.

Filed Apr. 14, 1975, Ser. No. 567,973
Int. Cl.[2] G01S 7/38
U.S. Cl. 343—18 E 10 Claims



6. A quasi-coherent memory for use in a deceptive jamming system in which an incoming pulse is gated to the memory upon detection and wherein a reset signal is generated upon detection of an incoming signal, comprising:

a two input terminal, four output terminal phasing network for providing at each of its four output terminals a signal having an amplitude related to the phase difference between signals at its two input terminals and for providing at its four output terminals the signal at one of its input terminals, respectively shifted by four different amounts;

means for coupling said gated input signal to said one input terminal;

an amplifier;

means for initially switching one of said output terminals to the input of said amplifier responsive to said reset signal;

means for coupling the output of said amplifier with a fixed delay to the other of the input terminals of said phasing network;

means for providing four separate d.c. voltages corresponding respectively to the amplitudes of the signals at said four output terminals; and

means responsive to the amplitudes of said d.c. signals for switching to said amplifier that output terminal of said phasing network carrying a signal the phase of which differs from that of the signal at said one input terminal by no more than a predetermined number of degrees after two signals are simultaneously applied to the two input terminals of the phasing network.

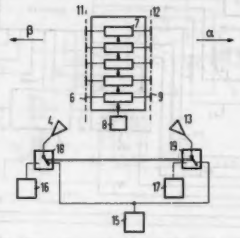
3,971,022

PHASED-ARRAY ANTENNA EMPLOYING AN ELECTRICALLY CONTROLLED LENS

Karl-Ludwig Lenz, Krailling, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Jan. 20, 1975, Ser. No. 542,365
Claims priority, application Germany, Feb. 6, 1974, 2405520
Int. Cl.[2] H01Q 3/26
U.S. Cl. 343—754 15 Claims

1. In a phased-array antenna in which transmitting energy from a primary feed system is radiated through free space as a primary wave to a plurality of first radiator elements, arranged in rows and columns in a single plane where they are received, and conducted over a plurality of phase shift elements, which may be electronically controlled, and which convert the primary wave into a planar wave and additionally effect a desired beam deflection, with such waves being radiated by a plurality of second radiator elements, in the form of a planar wave, which second radiator elements are likewise arranged in rows and columns in a single plane and are correspondingly disposed with respect to the first radiator elements, and in which received energy passes in the opposite direction along the same path, a second primary feed system being disposed at the second radiator elements with said second primary feed system being supplied with transmitting energy which is radiated through free space, as a primary wave, to the second radiator elements where it is received, conducted over said phase shift elements and radiated by the first radiator elements in the form of a planar wave, said second primary feed system being geometrically positioned relative to the plane of the second radiator elements in exactly the same relation as the first primary feed system is positioned relative



to the plane of the first radiator elements, with each of the two primary feed systems being geometrically arranged off-center relative to the particular face of the associated radiator elements, in particular disposed therebelow, the combination of respective delay lines connected in series with the associated phase shift elements, which lines are so designed that they balance the transit time differences associated with the oblique positioning of the primary feed systems and possibly for focusing, and which extend between each of the primary feed systems and the radiator elements associated with the respective phase shift elements.

3,971,023

PARABOLIC REFLECTOR ASSEMBLED FROM TRIANGULAR SHAPED PETALS

Robert B. Taggart, 1789 Lark Lane, Sunnyvale, Calif. 94087

Filed Dec. 30, 1974, Ser. No. 537,094
Int. Cl.[2] H01Q 15/16, 15/20
U.S. Cl. 343—840 8 Claims

1. A reflector for high-gain antenna comprising:

a plurality of generally planar triangular electromagnetically reflective petals having a longitudinal axis and rectilinear major edge shape; and

means connecting the petals in edgewise substantially overlapping relation to form a reflector having a shape of a surface of revolution, each petal taking the form along its longitudinal axis of the line that generates the surface of revolution and generally curvilinear transverse form;

the connecting means including a plurality of paired fasteners coupling the overlapping edges of said petals through holes therein at predetermined locations with respect to the longitudinal axis of the petals which define the conformation of the assembled reflector.

3,971,024
PROTECTIVE METAL SHIELD FOR PLASTIC FUZE RADOMES

Samuel A. Clark, Jr., Wheaton; George K. Lucey, Jr., Colesville, both of Md., and Thomas H. Zimmerman, Reston, Va., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

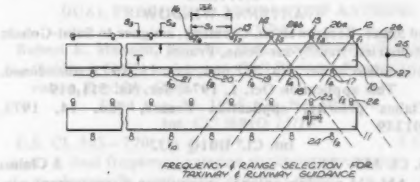
Filed May 29, 1973, Ser. No. 364,576
Int. Cl.² H01Q 1/42; F42C 13/04
U.S. Cl. 343—872 **7 Claims**

1. In combination with a thermoplastic fuze radome, a protective structure for internal fuze components comprising a conductive cap in contact with the forward surface of said radome, means for preventing relative movement of said cap and said radome, and means for allowing radiation to be emitted from the interior of said radome, wherein said cap is a hollow cone of sheet metal comprising an umbrella located at the nose thereof, means for reducing triboelectric charging located at the base thereof, and means for connection of said umbrella to said means for reducing triboelectric charging.

3,971,025
AIRPORT GROUND SURVEILIANCE SYSTEM WITH AIRCRAFT TAXI CONTROL FEATURE

Arnold M. Levine, Chatsworth, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Division of Ser. No. 320,089, Jan. 2, 1973, Pat. No. 3,872,474. This application Jan. 27, 1975, Ser. No. 544,194
Int. Cl.² G01S 1/16, 1/18
U.S. Cl. 343—108 R **7 Claims**



FREQUENCY & RANGE SELECTION FOR TAXIWAY & RUNWAY GUIDANCE

1. A system particularly for traffic control on at least one vehicular pathway over a predetermined portion of the surface of an airport, comprising:

a symmetrical arrangement of sources of short duration microwave pulses, each of said sources comprising a pair of transmitters oppositely disposed, one on each side of said pathway, a line between said transmitters of said pair being generally normal to the direction of said pathway at the corresponding transmitter pair location;

a source of timing pulses;

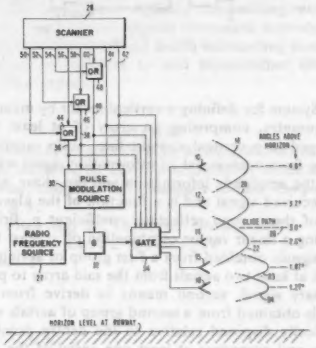
cable means for conveying said timing pulses successively to said source pairs to cause substantially simultaneous transmission from said transmitters of each of said sources, said sources transmitting in succession along said pathway as a function of the inherent delay provided by said cable;

and receiving and steering means within a vehicle to be controlled along said path, for detecting said microwave pulses and for controlling said steering means to tend to cause said vehicle to follow said pathway by steering to maintain time coincidence of the detected microwave pulses.

3,971,026
MULTIPLE BEAM GLIDE SLOPE RADIO NAVIGATION METHOD WITH TWO CLASSES OF BEAMS

Donald J. Toman, Pleasantville, N.Y., assignor to Tull Aviation Corporation, Armonk, N.Y.

Filed Feb. 14, 1975, Ser. No. 549,946
Int. Cl.² G01S 1/18, 1/44
U.S. Cl. 343—108 M **16 Claims**



1. A method of radiating a pattern of navigation guidance signals to an aircraft to define a glide path with a minimum of distortion from the terrain and structures beneath the guidance signal pattern comprising

transmitting the signals in a pattern of beams of radio carrier frequency energy with different beams positioned at different angles above and below the guidance path,

switching carrier frequency energy in a sequence from one beam to another to radiate energy in all of the beam positions to establish the pattern of beams,

applying a program of modulation to the radio carrier frequency energy for each of said beams to define the glide slope path,

said beams comprising a class of upper beams and a class of lower beams positioned beneath said upper beams,

said class of upper beams consisting of a plurality of beams of uniform angular width in elevation and having a uniform angular center-to-center beam spacing in elevation,

said class of lower beams consisting of at least one beam,

each beam of said lower beams having a reduced angular width in elevation which is a single predetermined fraction of the width of each of said upper beams,

each of said lower beams having a center line angular spacing in elevation beneath the center line of the next higher beam which is generally reduced from the spacing between said upper beams in proportion to the reduced beam width,

the peak energy radiated at the center lines of each of said upper beams being substantially uniform,

the peak energy radiated at the center lines of each of said lower beams being proportional to the peak energy radiated in each of said upper beams,

the proportion being an inverse function of the respective beam widths.

3,971,027

RADIO INTERFEROMETER SECTOR-DEFINITION

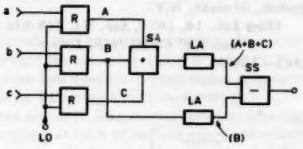
Robert Nicholas Alcock, Reigate; Richard Paul Vincent, Crawley, and Stephen Joseph Robinson, South Godstone, all of England, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 13, 1974, Ser. No. 523,328

Claims priority, application United Kingdom, Nov. 21, 1973, 53983/73

Int. Cl.² G01S 3/48

U.S. Cl. 343—113 R **4 Claims**



3. System for defining a vertical sector by means of radiointerferometry, comprising an array of at least three aerials arranged in a vertical straight line, radio receiver means to obtain from each aerial an information signal which contains both the amplitude information and the phase information of the received signal and is a function of the elevation angle θ and of the ground reflection coefficient p, first means for forming a linear vector combination of at least two information signals obtained from a first group of aerials which comprises at least two aerials from the said array to provide a first auxiliary signal, second means to derive from information signals obtained from a second group of aerials which is symmetrically disposed relative to the centre point of the first group and comprises at least one aerial of the said array to provide a second auxiliary signal, and a dividing device to divide one auxiliary signal by the other to provide a quotient signal which is a function of θ but is independent of p.

3,971,028

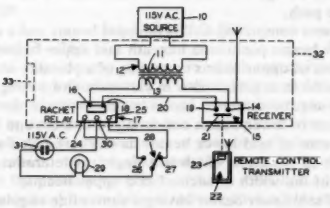
REMOTE LIGHT CONTROL SYSTEM

Larry L. Funk, Boonsboro, Md., assignor to Larry L. Funk and James P. Oliver, Greencastle, Pa.

Filed Dec. 26, 1974, Ser. No. 536,649

Int. Cl.² H04Q 7/00

U.S. Cl. 343—225 **2 Claims**



1. A remote control apparatus for home lighting and the like comprising a portable radio signal transmitter adapted for manual operation at a remote point, a coacting radio signal receiver adapted for placement in a home or the like having contacts which close upon reception of a radio signal by the receiver, a step down transformer having a primary coil adapted for coupling to a source of alternating house current and a secondary coil having first and second terminals, one secondary coil terminal coupled with one contact of said receiver, a ratchet relay having first and second terminals, a normally open contact, a normally closed contact and a common contact, one terminal of the ratchet relay being coupled with the second terminal of said transformer secondary coil and the secondary terminal of the ratchet relay being coupled with a second terminal of said receiver, a house lighting circuit including a manual light switch having a pair of contacts which are electrically coupled to said normally open and normally closed ratchet relay contacts, and said house lighting circuit having a conductor coupled with said common contact of the ratchet relay, said common contact having power thereon.

3,971,029

WINDOW ANTENNA DEVICE FOR USE IN MOTOR VEHICLE

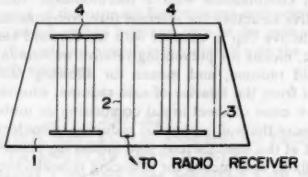
Taketsugu Torii, Kasugai, and Minoru Nishio, Okazaki, both of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan

Filed Oct. 3, 1974, Ser. No. 511,935

Claims priority, application Japan, Jan. 14, 1974, 49-7433[U]

Int. Cl.² H01Q 1/32, 1/02

U.S. Cl. 343—704 **5 Claims**



3. A window antenna device, comprising an elongated antenna wire fixed to a window, coupling means for electrically connecting said antenna wire to a receiver remote from said window, and auxiliary means for increasing the gain of said antenna wire including an electrically isolated elongated wire spaced from said antenna wire and fixed to said window substantially in parallel with said antenna wire, and isolated wire being electrically floating.

3,971,030

ANTENNA WINDOW

Gerd Sauer, Broichweiden, Germany, assignor to Saint-Gobain Industries, Neuilly-sur-Seine, France

Continuation of Ser. No. 322,606, Jan. 11, 1973, abandoned. This application Oct. 1, 1974, Ser. No. 511,019

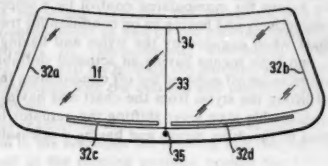
Claims priority, application France, Jan. 14, 1972, 72.01249

Int. Cl.² H01Q 1/32

U.S. Cl. 343—713 **3 Claims**

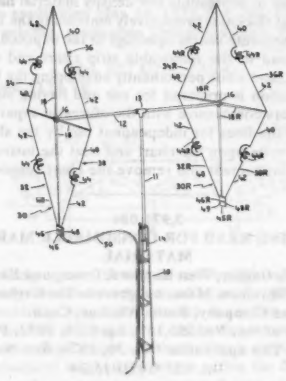
1. AM-FM window antenna comprising a transparent window, two conductors applied to the window, each of said conductors being adapted to receive amplitude modulated signals having frequencies of the order of 1,000 kilocycles per second and frequency modulated signals havng frequencies of the order of 100 megacycles per second, each of said conductors being moreover tuned for half-wave resonance within the band of said frequency modulated signals, a terminal applied to said window, at least one of said conductors connecting to

said terminal on said window, said conductors connecting to each other at a point on said window between and at unlike



distances from the ends of one of said conductors, whereby the directivity of said antenna may be optimized.

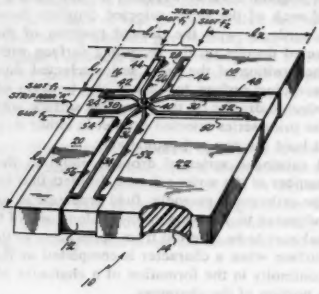
3,971,031
LOADED QUAD ANTENNA
Emmett F. Burke, 4501 Vallacher Ave., Minneapolis, Minn. 55416
Filed Oct. 31, 1975, Ser. No. 627,525
Int. Cl.² H01Q 7/00
U.S. Cl. 343—744 **12 Claims**



1. An antenna structure comprising first, second, third and fourth antenna elements, each element having a loading coil serially connected therein, and means for supporting said elements in a substantially common plane with each element oriented generally perpendicular to the other.

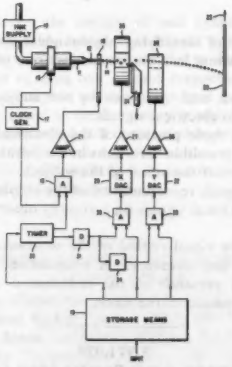
3,971,032
DUAL FREQUENCY MICROSTRIP ANTENNA STRUCTURE
Robert E. Munson, Boulder, Colo., and Harold T. Buscher, Oakland, Calif., assignors to Ball Brothers Research Corporation, Boulder, Colo.
Filed Aug. 25, 1975, Ser. No. 607,418
Int. Cl.² H01Q 13/18
U.S. Cl. 343—770 **8 Claims**

1. A dual frequency antenna structure comprising:
an electrically conducting ground surface;
a dielectric layer extending on top of said ground surface;
a plurality of separated electrically conducting elements disposed on top of said dielectric layer in a spaced-apart configuration leaving intersecting strip areas therebetween and defining:
first and second intersecting means for transmitting/receiving electromagnetic waves of a first predetermined frequency, and
third and fourth intersecting means for transmitting/receiving electromagnetic waves of a second predetermined frequency,
input/output electrical connection means disposed on top of said dielectric layer within said intersecting strip areas, and



microstrip electrical conductors also disposed on top of said transmitting/receiving layer within said intersecting strip areas, said conductors defining transmitting/receivving electrical transmission circuits connected individually to said first, second, third and fourth intersecting means and connected in common to said input/output electrical connection means.

3,971,033
METHOD AND APPARATUS FOR APPLYING MAGNETIC LIQUID DROPLETS TO A RECORDING SURFACE
George J. Fan, Ossining, N.Y., assignor to IBM Corporation, Armonk, N.Y.
Filed May 27, 1975, Ser. No. 580,655
Int. Cl.² G01D 15/18
U.S. Cl. 346—1 **22 Claims**



14. A method for applying droplets of a magnetic liquid to a recording surface to form characters thereon including:
producing a stream of magnetic liquid droplets and projecting same toward the recording surface in a first direction;
selecting one or a series of droplets from the stream for application to the recording surface to form thereon a character or a portion of a character when there is a discontinuity in the formation of the character;

directing the selected droplets through orthogonal magnetic field gradients;

selecting the length of the orthogonal magnetic field gradients to have at least two of the series selected droplets within the orthogonal magnetic field gradients at any time;

selectively varying the gradient along at least one of the orthogonal axes with respect to time during the passage of each of the series selected droplets therethrough in accordance with the desired position of the series selected droplet on the recording surface with respect to the position of the prior series selected droplet on the recording surface to change the position of the series selected droplet on the recording surface with respect to the prior series selected droplet in either direction along at least the one orthogonal axis;

and causing a series of droplets equal to the maximum number of the series selected droplets that can be within the orthogonal magnetic field gradients at any time and subjected to a varying gradient along one of the orthogonal axes to be diverted from application to the recording surface when a character is completed or there is a discontinuity in the formation of a character after forming a portion of the character.

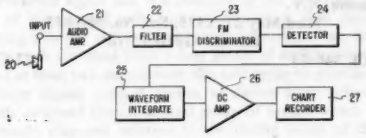
3,971,034
PHYSIOLOGICAL RESPONSE ANALYSIS METHOD AND APPARATUS

Allan D. Bell, Jr., Annandale; Wilson H. Ford, Arlington, and Charles R. McQuiston, Falls Church, all of Va., assignors to Dektor Counterintelligence and Security, Inc., Springfield, Va.

Continuation of Ser. No. 113,949, Feb. 9, 1971, abandoned. This application Sept. 5, 1972, Ser. No. 286,426

Int. Cl.[2] G01D *1/04*

U.S. Cl. 346—1 **9 Claims**



1. A method of identifying physiological manifestations of psychological stress in a human subject comprising the steps of

converting an oral utterance by the subject from sound energy into electrical signals;

emphasizing those portions of the electrical signals which represent inaudible variations in the infrasonic frequency modulation of the voice of the subject;

recording signals representative of the emphasized portions of the electrical signals on a visually observable medium; and

observing the visual record of the utterance to determine increases and decreases in modulation variations, the degree of presence of the modulation constituting an inverse measure of the stress.

3,971,035
THERMOGRAPH WITH REMOVABLE CARTRIDGE

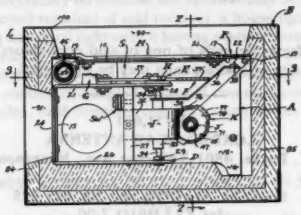
William H. Maxwell, West Los Angeles, Calif., assignor to Cargo Graphics Corporation

Filed May 17, 1974, Ser. No. 470,901

Int. Cl.[2] G01D *9/10*; G01K *5/70*; B65D *85/38*

U.S. Cl. 346—33 TP **3 Claims**

1. A thermograph including in combination; an instrument supporting a thermometer means with a stylus positioned in response to temperature and normally pressed into engagement against a removable strip chart, drive means for said strip chart, said instrument adapted to be pre set and loaded with said removable strip chart for time-temperature recording and having means exposing the chart to be written upon and having means for manipulated control by a shipper and receiver respectively and having an on condition for transporting the chart when engaged by the stylus and having an off condition, and logic means having an actuator shiftable from an on position to an off position for off conditioning the drive means and lifting the stylus from the chart and having a frictionally positionable start lever shifting the actuator into the on condition of the drive means and having a releasable stop



lever shifting the actuator into the off condition of the drive means, a liner of depressible low density material having walls of substantial thickness protectively embracing the instrument and having separate access openings to the exposed chart and start lever and to the removable strip chart and stop lever respectively, and a box permanently enveloping the liner when the combination is prepared for use and having separate reclosable doors coextensive with the aforesaid separate access openings in the liner for independent use by the shipper and receiver to write upon the chart and start the instrument and to stop the instrument and remove the chart respectively.

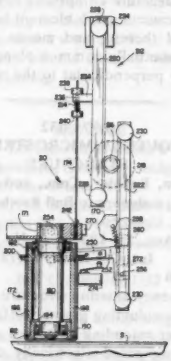
3,971,036
PLOTTING HEAD FOR CONSUMABLE MARKING MATERIAL

Heinz Joseph Gerber, West Hartford, Conn., and Earle Merritt Chase, Wilbraham, Mass., assignors to The Gerber Scientific Instrument Company, South Windsor, Conn.

Division of Ser. No. 353,117, April 30, 1973, Pat. No. 3,857,527. This application Oct. 30, 1974, Ser. No. 519,072

Int. Cl.[2] G01D *15/24*

U.S. Cl. 346—139 C **16 Claims**



1. In a plotting system in which a recording medium and a plotting head are moved relative to one another to generate graphical information on the medium, the plotting head employing slender shafts of consumable marking material comprising:

support means including a magazine for holding a plurality of shafts of consumable material with one shaft in a plotting position and with one end of said one shaft adjacent the recording medium; the magazine being rotatably mounted about an axis on the plotting head and having a plurality of compartments distributed circumaxially about the axis for holding the plurality of shafts in parallel relationship with the axis and said one shaft in the plotting position;

means registering with said one shaft in said plotting position in the magazine for pressing said one end of said one shaft in the plotting position against the recording medium and for feeding said shaft toward the recording medium as said one end of said shaft is consumed; and

means for indexing the rotatable magazine to bring another consumable shaft in a magazine compartment into the plotting position in precise registration with the means for pressing and feeding when said shaft in the plotting position is substantially consumed.

3,971,037

MAGNETIC BUBBLE SHIFT REGISTER

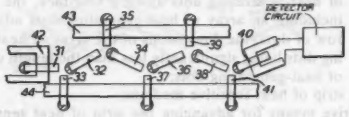
Reginald David Enoch, Pinner, and Mervyn Evan Jones, London, both of England, assignors to The Post Office, London, England

Continuation of Ser. No. 385,725, Aug. 6, 1973, abandoned. This application May 14, 1975, Ser. No. 577,460

Claims priority, application United Kingdom, Aug. 8, 1972, 36895/72

Int. Cl.[2] G11C *11/14*

U.S. Cl. 340—174 TF **12 Claims**



1. A shifting register having an ordered plurality of binary digital storage elements each formed by an elongate pattern of high permeability magnetic material on a film of magnetic material common to the patterns and having means for providing a magnetic field across which the film is disposed so as to sustain cylindrical magnetic domains within the film, the pattern being such as to retain a cylindrical magnetic domain at one end or the other of the pattern and to permit transfer of the domain between the ends thereof, each pattern retaining a respective domain, the register further including means coupling adjacent storage elements for causing in response to a shifting pulse the domains in the storage elements to be moved to ends thereof corresponding respectively to the ends of the immediately preceding storage elements at which domains were located prior to the shifting pulse.

3,971,038

COERCIVITY CONTROL AND DETECTION SIGNAL GENERATING PATTERN FOR UNIAXIALLY ANISOTROPIC FERROMAGNETIC CRYSTAL PLATELETS

Jon H. Myer, Woodland Hills, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed July 29, 1974, Ser. No. 492,390

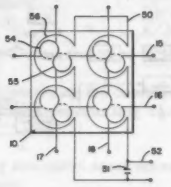
Int. Cl.[2] G11C *11/14*

U.S. Cl. 340—174 TF **8 Claims**

1. In a digital signal translating device of the type having at least one uniaxially anisotropic ferromagnetic crystal platelet having its major plane surface cut perpendicularly to the easy axis of magnetization of said crystal and being capable in the presence of an externally applied magnetic biasing field of sustaining movable cylindrical magnetic domains having their cylindrical axes lying along said easy axis of magnetization, means to apply said magnetic biasing field to said crystal, and conductor access array means to control the positions of said movable domains in said platelet comprising magnetic field generating conductor means to define an array of cylindrical domain retaining positions in said crystal, the improvement comprising:

a two-dimensional lattice array of dots of magnetically susceptible material in intimate physical contact with said major plane surface of said crystal platelet, said material of said dots having a higher permeability than that of said crystal platelet and said array extending over a predetermined area comprising the entire portion of the plane of said major plane surface of said crystal platelet which is to be positioned adjacent said access conductor array means:

each of said dots having a maximum dimension in said plane which is no greater than one-fifth of the minimum diameter of the cylindrical domains which can be sustained in said platelet and each of said dots having a center-to-center spacing from the nearest other dot in said array which is less than one-half said minimum diameter, said center-



to-center spacing being uniform between all dots lying on a straight line drawn through any two dots to form a symmetrical array having no predetermined alignment relationship with any individual conductor of said conductor access array but extending uniformly and symmetrically over said entire predetermined area adjacent said conductor access array;

said dots forming in said predetermined area an orderly array positioned to provide a predetermined localized coercivity in said predetermined area of said crystal platelet; and

means to detect the motion of said cylindrical magnetic domains in said crystal, said means comprising means inductively coupled to said platelet to detect the motion of field of at least one of said magnetic domains, said inductively coupled means being tuned to resonance at a frequency equal to the frequency at which said magnetic domain is expanded and contracted by said array of dots when said cylindrical domain is moved by a predetermined drive field resulting from a current applied to said conductor access means.

3,971,039

INK JET SYSTEM PRINTER WITH TEMPERATURE COMPENSATION

Rikuo Takano, Gusashino; Yuji Sumitomo, Nara; Yoichi Yamamoto, Nara; Tomoo Makita, Nara, and Masahiko Aiba, Nara, all of Japan, assignors to Nippon Telegraph and Telephone Public Corporation, Tokyo and Sharp Kabushiki Kaisha, Osaka, both of, Japan

Filed Nov. 25, 1974, Ser. No. 526,824

Claims priority, application Japan, Nov. 24, 1973, 48-135821

Int. Cl.[3] G01D *18/00*

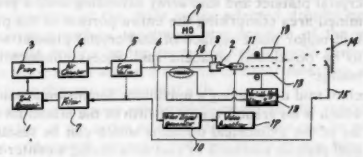
U.S. Cl. 346—75 **8 Claims**

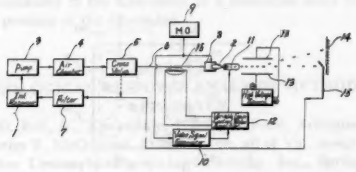
1. In an ink jet system printer including a nozzle unit for emitting ink droplets toward a recording paper, a conduit for conducting ink liquid to the nozzle, a charging electrode for charging the ink droplets and deflection electrodes for estab-

lishing an electric field in order to deflect the charged ink droplets, the improvement comprising:

a temperature sensor attached directly to or adjacent to the conduit for detecting ink liquid temperature;

compensation means coupled with the temperature sensor for compensatively varying a voltage level applied to the charging electrode in accordance with the variations of the ink liquid temperatre, said compensation means including a differential amplifier adapted to receice the





video signals through the temperature sensor at one receive terminal thereof and voltage amplifying means including a transistor, the base of which is connected to receive the output signals of the differential amplifier, the output signals of the amplifying means being applied to the charging electrode;

a video signal generator for generating video signals in accordance with printing information; and

wiring means for coupling the video signals with the charging electrode via said compensation means.

3,971,040

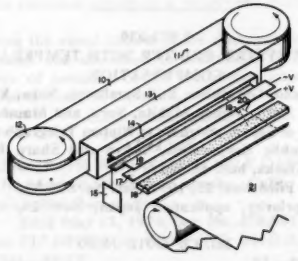
INK DROP PRINTER WITH TRAVERSING ORIFICE BAND

Stephen F. Skala, 3839 S. Wenonah, Berwyn, Ill. 60402

Continuation-in-part of Ser. No. 421,425, Dec. 3, 1973, abandoned. This application Aug. 20, 1975, Ser. No. 605,993

Int. Cl.² G01D *15/18, 9/00*

U.S. Cl. 346—75 **7 Claims**



1. A method of printing by selectively depositing ink drops under pressure onto a receiving surface in response to graphic information from a signal source including the steps of

positioning a body of liquid ink to contact a portion of a flexible endless band having a plurality of uniformly spaced orifices,

moving the orifice band to provide a traversing motion for ink passing through the orifices, said ink forming traversing ink drops which project toward a receiving surface,

modulating said ink so that the ink drops approaching the receiving surface deposit thereon in a graphic pattern in accordance with said graphic information from said signal source.

3,971,041

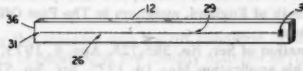
CHART RECORDER USING A FIXED THERMAL PRINT HEAD

Charles F. Mason, Indianapolis, Ind., assignor to Esterline Corporation, New York, N.Y.

Continuation of Ser. No. 403,249, Oct. 3, 1973, abandoned. This application Nov. 13, 1974, Ser. No. 523,269

Int. Cl.² G01D *9/34, 15/10*

U.S. Cl. 346—76 R **3 Claims**



1. A chart recorder for graphically displaying data comprising:

a chassis;

a print head mounted on the chassis and having a single row of heat-generating dots along a first face, the first face including an array of heat-generating dots adjacent the row of dots, the dimensions of the array of heat-generating dots being significantly less than the length of the row of heat-generating dots;

a strip of heat sensitive medium;

drive means for advancing the strip of heat sensitive medium across the row of dots and the array of dots, the heat sensitive medium advanced past the print head being marked by dots in the row of heat generating dots to produce graphical representations and by the array of dots to produce a symbolic character.

3,971,042

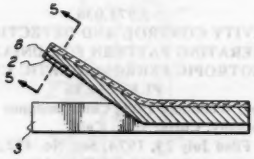
WRITING APPARATUS HAVING WEAR RESISTANT MATERIAL

Howard D. Ring, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Continuation of Ser. No. 14,138, Feb. 25, 1970, abandoned. This application Oct. 12, 1972, Ser. No. 297,107

Int. Cl.² G01D *15/06*

U.S. Cl. 346—139 C **1 Claim**



1. A stylus for forming images on the recording medium of a printing apparatus comprising:

a base adapted to be inserted in a connector socket of said printing apparatus to receive control signals, one end of said stylus mounted on said base,

a writing edge formed at the free end of said stylus, and

a chip of wear resistant material attached to the free end of said stylus initially on the side opposite from the writing

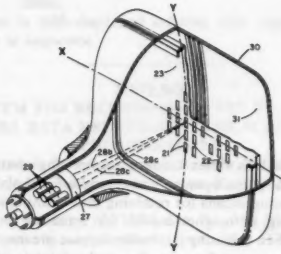
edge whereby said writing edge is eventually protected from excessive wear in sweeping across said recording medium.

3,971,043

APPARATUS FOR MAKING ELECTROLUMINESCENT SCREENS FOR COLOR CATHODE RAY TUBES

Takeshi Suzuki, Fukaya; Shigeo Takenaka, Kanagawa; Hiroshi Tanaka, Fukaya, and Masanori Akiyama, Honjo, all of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Division of Ser. No. 390,253, Aug. 21, 1973, Pat. No. 3,888,673. This application May 5, 1975, Ser. No. 574,637
Claims priority, application Japan, Aug. 21, 1972, 47-82832; Aug. 22, 1972, 47-83711
Int. Cl.² G03B *41/00*
U.S. Cl. 354—1 15 Claims



1. An apparatus for preparing a developable pattern comprising continuous vertical stripes on a panel for a cathode ray tube having a film comprising photosensitive material having a predetermined response to incident light, said panel having a concave shadow mask attached thereto, said shadow mask having on its concave face a number of beam-passable apertures separated by bridge members and arranged in rows parallel with each other, comprising:

a. a light source placed at a predetermined position with respect to said panel on the opposite side of said mask from said panel for projecting light on said film on said panel in a pattern comprising images defined by the apertures of said shadow mask, said light source having an effective length in the lengthwise direction of the rows of the apertures greater than the length of one of the beam-passable apertures in the shadow mask to extend the image of each aperture on said panel in the lengthwise direction to reduce the effects of the shadow cast by said bridge members on said film and form said continuous vertical stripes; and

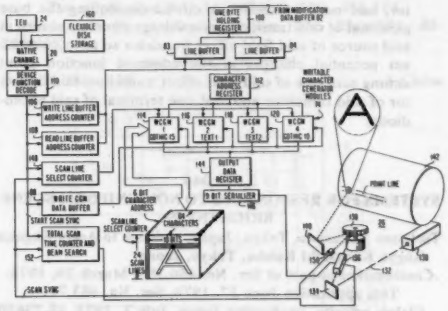
b. means for vibrating said light source at least along a direction perpendicular to the longitudinal axis of said light source and parallel to said panel with predetermined amplitude and frequency to create a superposed image on said screen from said light source through each of said apertures and thereby substantially reduce diffraction phenomena effects created by the edges of each such aperture on the pattern of radiation on said screen.

3,971,044

ELECTRONIC HORIZONTAL SHIFTING AND VARIABLE PRINT WIDTH IN A BUFFERED PRINTER

Gerald Ivan Findley, Morgan Hill, and Teddy Lee Anderson, San Jose, both of Calif., assignors to IBM Corporation, Armonk, N.Y.

Filed Nov. 11, 1974, Ser. No. 522,997
Int. Cl.² G03B *15/24*
U.S. Cl. 354—9 14 Claims



1. A printing system comprising the combination of:

means for providing data representing characters to be printed;

a printable medium;

means for undergoing successive scans across the width of the printable medium;

means associated with the means for undergoing scans and responsive to the data for printing characters represented by the data on the printable medium as the scans are made when the means for printing is turned on; and

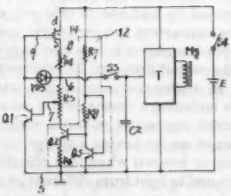
means responsive to the start of each scan of the means for undergoing scans for turning on the means for printing after the means for undergoing scans has scanned a selected, adjustable distance across the width of the medium.

3,971,045

LIGHT MEASURING CIRCUIT

Yasuhiro Nanba, Osaka, and Motonobu Matsuda, Izumi, both of Japan, assignors to Minolta Camera Kabushiki Kaisha, Japan

Filed Aug. 21, 1975, Ser. No. 606,542
Claims priority, application Japan, Aug. 21, 1974, 49-95902
Int. Cl.² G03B *7/08;* G01J *1/44*
U.S. Cl. 354—23 R 3 Claims



1. A light measuring circuit comprising:

a power source;

a photo-diode for generating photo-electric current as a function of light incident thereon;

a transistor having a base, an emitter and a collector, said collector being connected to one terminal of said photo-diode for receiving the photo-electric current therefrom;

an electrical load circuit;

a field effect transistor having its source connected to said power source through said electric load circuit, said field effect transistor having its gate coupled to the joint connection of said photo-diode and said collector of said transistor, said field effect transistor further having its source connected to the other terminal of said photo-diode;

a negative feedback circuit including said gate and source of said field effect transistor and said base of said transistor, said negative feedback circuit controlling the base potential of said transistor by a voltage signal produced at said source of said field effect transistor so as to counteract potential changes at the common junction point among said gate of said field effect transistor, said collector of said transistor and said one terminal of said photo-diode.

3,971,046

SYSTEMS FOR RESPONDING TO NON-UNIFORM SCENE BRIGHTNESS

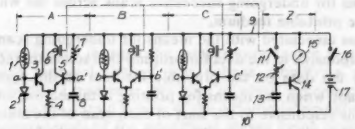
Tsukumo Nobusawa, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Continuation-in-part of Ser. No. 456,380, March 29, 1974. This application June 27, 1974, Ser. No. 483,711

Claims priority, application Japan, July 2, 1973, 48-73650

Int. Cl.² G03B *7/08*

U.S. Cl. 354—24 **12 Claims**



1. In a system for responding to non-uniform scene brightness, a plurality of identical photosensitive means for respectively receiving light from different parts of a scene, for respectively providing, from the received light, inputs which vary according to a geometric progression in accordance with variation in light brightness, and for providing at a pair of said photosensitive means, respectively, maximum and minimum inputs when the scene has light of non-uniform brightness to be received by the plurality of photosensitive means, output means for providing an output from at least one of said pair of photosensitive means, and electrical connecting means electrically connecting said plurality of photosensitive means with said output means for providing at said output means an output determined by said one of said pair of photosensitive means and for converting the geometric progression of said input of each photosensitive means into an arithmetic progression so that the output provided by said output means varies according to an arithmetic progression, said electrical connecting means including a timing circuit means having a resistor and capacitor connected in series with said capacitor of said timing circuit means having a charge which progressively changes during an interval when said plurality of photosensitive means respond to light from different parts of a scene, and said electrical connecting means further including a relay switch means operatively connected with said timing circuit means as well as with said plurality of photosensitive means for automatically opening said timing circuit means and terminating the change in the charge of said capacitor thereof in response to said light input of said one of said pair of photosensitive means, and the charge of said capacitor upon opening of said timing circuit means providing, at least in part, said output at said output means.

3,971,047

SINGLE LENS REFLEX CAMERA HAVING AN ELECTRIC SHUTTER

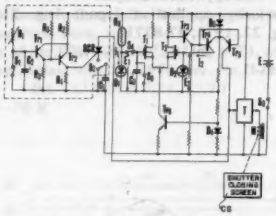
Yasuo Isobe, Kawasaki; Tadashi Ito, and Fumio Ito, both of Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed May 6, 1974, Ser. No. 467,473

Claims priority, application Japan, May 9, 1973, 48-51376

Int. Cl.² G03B *7/08, 9/62*

U.S. Cl. 354—50 **10 Claims**



6. A single lens reflex camera, comprising shutter means having a focal plane opening screen and a focal plane closing screen, retaining means for retaining said opening screen and then releasing it, magnet means for retaining said closing screen and then releasing it, shutter release means coupled to said retaining means for actuating said retaining means so as to release said opening shutter, first timing means responsive to ambient light and coupled to said magnet means for establishing a time interval on the basis of the ambient light and for causing said magnet to release said shutter closing screen subsequent to actuation of said first timing means and the elapse of the interval, second timing means actuated by said release means prior to actuation of said retaining means for establishing a second interval and actuating said first timing means after the actuation of said second timing means and elapse of the second interval.

3,971,048

EXPOSURE VALUE DISPLAY SYSTEM FOR A CAMERA

Tadashi Ito, Yokohama; Soichi Nakamoto, Machida, and Youichi Okuno, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Sept. 30, 1974, Ser. No. 510,711

Claims priority, application Japan, Oct. 2, 1973, 48-110731

Int. Cl.² G01J *1/44*; G03B *17/20*

U.S. Cl. 354—60 L **5 Claims**

1. An exposure value display system for a camera of TTL type comprising in combination:

a. a finder optical system, said finder optical system being associated with an objective lens;

b. sensor means arranged in said finder optical system to receive light passing through said objective lens;

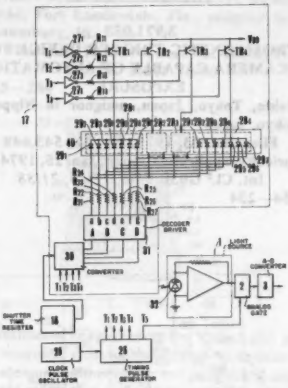
c. first control means for controlling the light-metering operation of said sensor means;

d. display means arranged in said finder optical system to display an exposure value;

e. second control means for controlling the display operation of said display means; and

f. pulse generator means connected to said first and second

control means for supplying output pulses which control the operation periods of said first and second control means in time-displaced relation with respect to each other in sequence.



3,971,049

SYSTEM FOR RECORDING ON THE FILM OF A CAMERA DATA RELATING TO THE SCENE BEING PHOTOGRAPHED

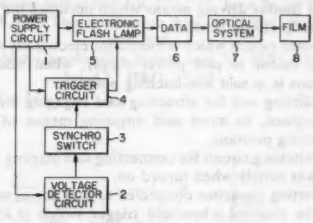
Sachio Ohmori, Yokohama, and Kouichi Takahata, Tokyo, both of Japan, assignors to Nippon Kogaku K.K., Tokyo, Japan

Filed May 13, 1974, Ser. No. 469,532

Claims priority, application Japan, May 17, 1973, 48-57278[U]

Int. Cl.² G03B 15/02

U.S. Cl. 354—127 **16 Claims**



1. A data photographing system for recording on the film of a camera, on which a scene is photographed, data illuminated by flash, the system comprising:

capacitor means;

means for applying a charge to said capacitor means;

electronic flash means adapted to discharge said capacitor means to illuminate the data at a brightness dependent upon the voltage level to which said capacitor means is charged; and

control means for causing said electronic flash means to discharge said capacitor means upon actuation of the shutter release mechanism of the camera if the voltage on said capacitor means hasreachedapredetermined voltage level required for providing a flash of predetermined brightness and for preventing said electronic flash means from discharging said capacitor means when the voltage on said capacitor means is less than said predetermined level and is thus incapable of producing a flash of said predetermined brightness, and predetermined voltage level being substantially higher than the minimum voltage level which would permit said electronic flash means to provide a flash.

3,971,050

ELECTRONIC FLASHLIGHT SYSTEM FOR CAMERAS

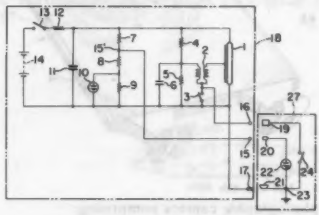
Keno Okuno, Kawasaki, and Kouichi Takahata, Tokyo, both of Japan, assignors to Nippon Kogaku K.K., Tokyo, Japan

Continuation of Ser. No. 315.451, Dec. 15, 1972, abandoned. This application July 24, 1974, Ser. No. 491,514

Claims priority, application Japan, Dec. 25, 1971, 46-2928[U]

Int. Cl.² G03B 15/05

U.S. Cl. 354—128 **1 Claim**



1. The combination of a camera body and an electronic flashlight comprising:

a main discharge tube in said electronic flashlight for flashing;

a main capacitor in said electronic flashlight for discharging said main discharge tube;

a first group of contacts on said electronic flashlight;

a second group of contacts on said camera body;

a first mounting member on said electronic flashlight;

a second mounting member on said camera body removably engageable with said first mounting member to secure said electronic flashlight to said camera body;

said first and second groups of contacts being arranged for automatic connection to each other when said first and second mounting members are engaged with each other;

a first indicator lamp of the glow discharge tube type in said electronic flashlight for indicating the readiness of said electronic flashlight to flash;

a second indicator lamp of the glow discharge tube type in said camera body for indicating the readiness of said electronic flashlight to flash, said second indicator lamp being connected to two contacts of said second group;

a trigger circuit in said electronic flashlight for triggering said main discharge tube, said trigger circuit being connected in parallel with said main capacitor between ground and a battery voltage terminal;

a voltage divider circuit in said electronic flashlight, said voltage divider circuit being connected in parallel with said main capacitor, between ground and said battery voltage terminal, independently of said trigger circuit and comprising a plurality of resistors connected in series with each other;

said first indicator lamp being connected between ground and a first voltage dividing resistance location on said voltage divider circuit; and

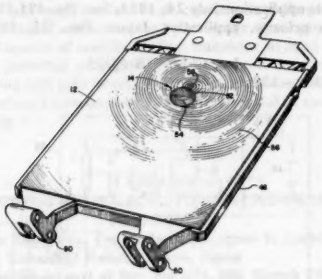
two contacts of said first group being connected between ground and a second voltage dividing resistance portion of said voltage divider circuit and said second voltage dividing resistance location has higher resistance to ground than said first voltage dividing resistance portion,

whereby when said first and second groups of contacts are connected to each other to produce current flow through said second indicator lamp, the voltage across said first voltage dividing resistance is reduced to turn off the first indicator lamp.

3,971,051
FOCUSING SCREEN

Philip G. Baker, Peabody, and Bruce K. Johnson, Andover, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed June 29, 1973, Ser. No. 375,015
Int. Cl.² G03B *13/28, 19/12*
U.S. Cl. 354—201 **14 Claims**

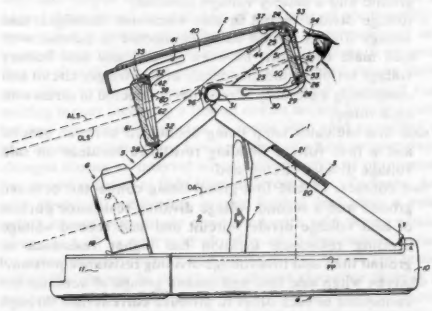


1. A photographic camera comprising:
an exposure chamber;
an objective lens to form a real image of a subject at a focal plane inside said exposure chamber;
a focusing screen, at said focal plane, for receiving said real image;
viewing means for enabling an observer to see said real image formed on said focusing screen;
an optical surface, on said focusing screen;
vernier focusing means located on said optical surface a predetermined distance eccentric from the geometrical center of said optical surface;
light diffusing means on said focusing screen surrounding said vernier focusing means;
a first Fresnel echelon on said optical surface surrounding said vernier focusing means for controlling the redistribution of light incident on said optical surface; and
a second Fresnel echelon and a third Fresnel echelon constituting said vernier focusing means.

3,971,052
COMPACT GALILEAN VIEWFINDER

William T. Plummer, Concord, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Apr. 21, 1975, Ser. No. 569,763
Int. Cl.² G03B *13/06*
U.S. Cl. 354—219 **5 Claims**

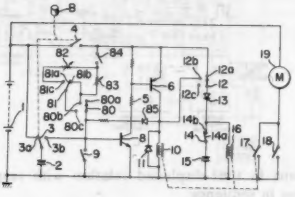


1. In a Galilean finder, a negative de-centered objective lens and a positive de-centered eye lens, said lenses being de-centered in the same sense to cause refractions in opposite senses of parallel rays entering said finder.

3,971,053
ELECTROMAGNETIC TRIGGER DEVICE FOR USE WITH CAMERA CAPABLE OF AUTOMATIC TIME EXPOSURE

Osamu Maida, Tokyo, Japan, assignor to Nippon Kogaku K.K., Tokyo, Japan

Filed Jan. 23, 1975, Ser. No. 543,649
Claims priority, application Japan, Jan. 25, 1974, 49-10089
Int. Cl.² G03B *9/08, 17/26, 21/38*
U.S. Cl. 354—234 **27 Claims**



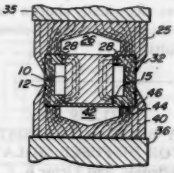
1. An electromagnetic trigger device for use with a camera of the type capable of automatic time exposure comprising:
a. a power supply;
b. a motor;
c. a trigger switch;
d. shutter driving means driven by said motor for driving a shutter and movable between a fully closed position and a fully open position, said shutter driving means fully opening the shutter when it is at the fully open position and fully closing the shutter when it is at the fully closed position;
e. engaging means movable between a latching position and a non-latching position, said engaging means being adapted, when moved to said latching position, to latch said shutter driving means which occupies the fully open or fully closed position;
f. a motor switch which is closed for electrically connecting said motor to said power supply, when said engaging means is in said non-latching position;
g. a starting coil for attracting said engaging means, when energized, to move said engaging means to said non-latching position;
h. a switching circuit for connecting said starting coil to said power supply when turned on;
i. a starting capacitor connected to said power supply so as to be charged when said trigger switch is opened and connected to said switching circuit to render said circuit conductive when said trigger switch is closed;
j. reset means for rendering said switching circuit non-conductive for a predetermined period during an interval beginning with the closing operation of said trigger switch, said predetermined period being shorter than the shorter of the time interval required for said shutter driving means to move from the fully closed position to the fully open position and the time interval required for said driving means to move from the fully open position to the fully closed position; and
k. a charging circuit interlocked with said shutter driving means for charging said starting capacitor connected to said switching circuit to thereby render said switching circuit conductive when said shutter driving means is in the fully open position, whereby conduction of the switching circuit by the charge of said starting capacitor through said charging circuit energizes said starting coil and then said motor to move the shutter driving means from the fully open position to the fully closed position.

3,971,054

METHOD AND APPARATUS FOR MAGNETIZING PERMANENT MAGNET IN MAGNETIC STRUCTURE

Leon Jasinski, Fort Lauderdale, Fla., assignor to Motorola, Inc., Schaumburg, Ill.

Filed July 12, 1974, Ser. No. 488,612
Int. Cl.² H01F 13/00
U.S. Cl. 335—284 10 Claims



1. The method of magnetizing the cylindrical permanent magnet of a magnetic structure which has an annular magnetic return path element connected to and in physical contact with the permanent magnet at one end thereof and which element forms an annular air gap with the permanent magnet adjacent the opposite end thereof, which method includes the steps of:

applying magnetic flux from the air gap through the periphery of the cylindrical permanent magnet and axially therein to the return path element adjacent the one end of the permanent magnet and through a parallel flux path in the return path element, and

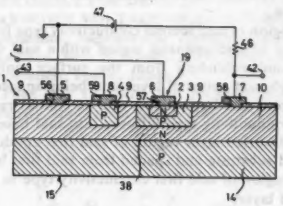
increasing the flux applied until the parallel flux path in the return path element is saturated and the magnetizing flux through the permanent magnet provides the desired magnetization thereof.

3,971,055

ANALOG MEMORY CIRCUIT UTILIZING A FIELD EFFECT TRANSISTOR FOR SIGNAL STORAGE

Michio Arai, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

Continuation-in-part of Ser. No. 373,731, June 26, 1973, Pat. No. 3,868,718. This application Aug. 21, 1974, Ser. No. 499,220
Claims priority, application Japan, Aug. 25, 1973, 48-95391
Int. Cl.² H01L 29/80
U.S. Cl. 357—22 8 Claims



1. An analogue memory circuit comprising,

a substrate of a first conductivity type,

first and second electrodes connected to said substrate and spaced apart to form a current channel therebetween,

a first region of opposite conductivity type formed in said substate between said first and second electrodes and forming a first PN junction,

a second region of first conductivity type formed in said first and forming a second PN junction,

means for applying a signal of a first polarity to said second region so as to forward bias said second PN junction and to reverse bias said first PN junction so that a charge proportional so said input signal is stored in said first region,

means for applying a blanking signal to said memory circuit to neutralize said charge stored in said first region, and

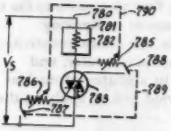
an output terminal connected to said memory circuit to remove a signal proportional to said stored input signal.

3,971,056

SEMICONDUCTOR TEMPERATURE SWITCHES

Stanley V. Jaskolski, Sussex; Robert W. Lade, Waukesha; Herman P. Schutten, Elm Grove; Gordon B. Spellman, Milwaukee, and Lawrence E. Van Horn, Greendale, all of Wis., assignors to Cutler-Hammer, Inc., Milwaukee, Wis.

Filed Feb. 18, 1975, Ser. No. 550,838
Int. Cl.² H01L 23/56, 29/74; H03K 3/35; H02P 1/44
U.S. Cl. 357—28 45 Claims



1. A semiconductor temperature switch actuatable at a predetermined temperature within a temperature range up to about 55°C and adapted for operating at voltages up to about 400 volts, comprising a semiconductor device formed of first, second, third and fourth layers defining therebetween first, second and third junctions:

said first layer being of one conductivity type of germanium and having a first current-carrying electrode attached thereto;

said second layer being a thin stratum of opposite conductivity type of germanium with a transfer efficiency of minority charge carriers thereacross of at least about 50%;

said third layer being of said one conductivity type of germanium and having a resistivity greater than 0.01 ohm-centimeter and a minority carrier diffusion length, L_d, between about 0.5 mils and about 5 mils, and a thickness equal to between about 0.1 L_d and about 10L_d;

said fourth layer being of said opposite conductivity type and having a second current-carrying electrode attached thereto;

said first junction having an injection efficiency of charge carriers into said second layer between about 50% and about 90%;

said second junction having a breakover voltage essentially equal to said operating voltage at said predetermined switching temperature within said temperature range when a voltage is applied to said electrode on said first layer with respect to said electrode on said fourth layer of such polarity as to reverse bias said second junction, and a low impedance subsequent to said switching at said predetermined temperature when said second junction becomes forward biased; and

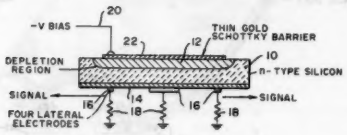
said third junction having an injection efficiency of charge carriers into said third layer of at least about 80%; whereby when said switch reaches said predetermined

temperature, said second junction changes from a reversed biased to a forward biased junction to permit a marked increase in the flow of current therethrough.

3,971,057
LATERAL PHOTODETECTOR OF IMPROVED SENSITIVITY

William P. Connors, Florissant; Richard H. Glaenzer, Bridgeton; George A. Saum, Florissant, St. Louis County, and Robert G. Wagner, University City, all of Mo., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 21, 1973, Ser. No. 391,404
Int. Cl.² H01L 27/14
U.S. Cl. 357—30 **9 Claims**



1. In the process of making a lateral photodetector including the steps of applying a Schottky barrier to one face of a semiconductor wafer, connecting a lead wire to the Schottky barrier, and connecting four electrodes to the opposite face of said wafer, the improvement comprising:

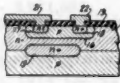
lowering, isotropically, the lateral resistivity of the opposite face of the semiconductor wafer; and

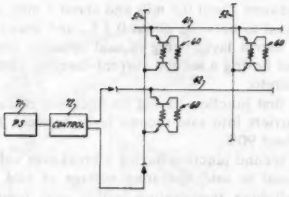
exposing said wafer to a source of nuclear radiation for a predetermined period before applying the Schottky barrier.

3,971,058
DUAL EMITTER PROGRAMMABLE MEMORY ELEMENT AND MATRIX

Lloyd D. Fagan, Santa Clara, and Gareth A. Tripp, Mountain View, both of Calif., assignors to Intersil Incorporated, Cupertino, Calif.

Filed Jan. 7, 1974, Ser. No. 431,394
Int. Cl.² G11C 11/44; H01L 29/72, 27/10
U.S. Cl. 357—36 **8 Claims**





1. An improved integrated circuit field programmable read only memory matrix comprising

a plurality of dual emitter transistor elements disposed in a single substrate with each transistor having, a high conductivity burried collector region,

a base region having no electrical contact thereto disposed above said burried collector region and having a PN junction therebetween,

and a pair of separate emitter regions extending into said base region from an upper surface thereof,

first electrical conductors connecting pluralities of first emitters of said transistors in separate rows; and

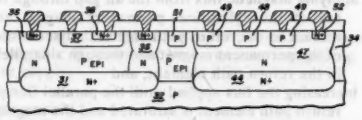
second electrical conductors connecting pluralities of second emitters of said transistors in separate columns to form a matrix having a programmable address at each crossover of row and column

whereby application of electrical power between a selected row and column to electrically short a base-emitter junction of an element connected therebetween programs an address of the matrix.

3,971,059
COMPLEMENTARY BIPOLAR TRANSISTORS HAVING COLLECTOR DIFFUSED ISOLATION

James L. Dunkley, Scottsdale, and Victor K. C. Liang, Phoenix, both of Ariz., assignors to National Semiconductor Corporation, Santa Clara, Calif.

Filed Sept. 23, 1974, Ser. No. 508,159
Int. Cl.² H01L 27/04, 29/08
U.S. Cl. 357—44 **7 Claims**



1. A semiconductor device comprising:

a first buried layer of a first conductivity type diffused into a substrate of a second conductivity type,

a first region of said first conductivity type formed in a frame-like pattern overlapping the periphery of said first buried layer region,

an epitaxial layer of said second conductivity type grown over said substrate, and said buried layer,

a second region of said first conductivity type formed in a frame-like pattern in the surface of said epitaxial layer and aligned with said first region, said first and second regions being diffused toward each other through said grown epitaxial layer until said first and second regions overlap,

a base region of said second conductivity type formed in the surface of said epitaxial region within said diffusion region and extending from the surface only part way through said epitaxial layer and being spaced at its bottom from said buried layer and an emitter region of said first conductivity type diffused into said base region,

a second buried layer region of said first conductivity type in said substrate and spaced from said first buried layer,

a third region of said first conductivity type in said second buried layer,

said epitaxial layer being grown over said second buried layer,

a fourth region of said first conductivity type in the surface of said grown epitaxial layer over said second buried layer region, said third and fourth regions diffused together to form a continuous base region of said first conductivity type extending from the surface of said grown epitaxial layer and down to said buried layer,

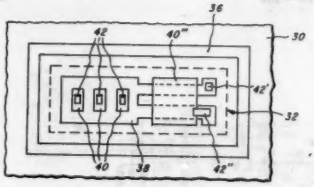
an emitter region of said second conductivity type diffused into said base region at the surface of said grown epitaxial layer, and

a collector region of said second conductivity type diffused into said base region at the surface of said grown epitaxial layer.

3,971,060
TTL COUPLING TRANSISTOR

Horst Leuschner, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed July 12, 1974, Ser. No. 486,706
Int. Cl.² H01L 27/04, 29/08
U.S. Cl. 357—51 **1 Claim**

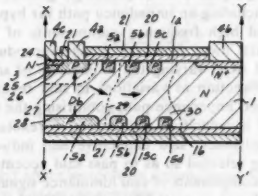


1. A transistor device comprising:
a. a single crystal body of semiconductor materials;
b. a first region of one conductivity type adjacent one surface of said body and of a resistivity suitable to act as the collector of the transistor;
c. a second region of the opposite type conductivity adjacent said one surface of said body entirely within and surrounded by said first region and of a resistivity suitable to act as the base of the transistor;
d. a plurality of third regions of said one type conductivity adjacent said one surface, each entirely within and surrounded by said second region;
e. a pair of elongated extensions of said second regions extending in substantially the same direction from said second region and terminating in areas remote from said third regions;
f. a fourth region of said one type conductivity adjacent said one surface having a resistivity approximately that of said third regions and contacting a length of each of said elongated extensions and said first region;
g. an ohmic base contact to one of said elongated extensions near the area of its termination; and
h. a collector contact making ohmic connection to both said fourth region and the other of said elongated extensions near the area of termination of said other elongated extension.

3,971,061
SEMICONDUCTOR DEVICE WITH A HIGH BREAKDOWN VOLTAGE CHARACTERISTIC

Takeshi Matsushita, Sagamihara; Hisao Hayashi, and Yoshiyuki Kawana, both of Atsugi, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed May 15, 1974, Ser. No. 470,153
Claims priority, application Japan, May 19, 1973, 48-55965
Int. Cl.² H01L 29/34
U.S. Cl. 357—52 **5 Claims**

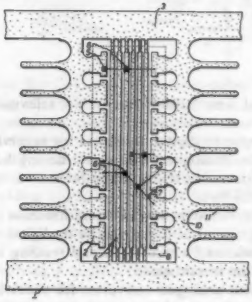


1. A semiconductor device comprising a semiconductor substrate having two major surfaces comprising a first region of one impurity type and a second region of the opposite conductivity type, said first and second regions forming a PN junction therebetween which junction extends to one major surface of said substrate, said PN junction being arranged to be reversely biased by an applied voltage, said substrate including at least one field limiting ring of opposite conductivity type semiconductor material formed therein adjacent said one major surface and spaced from said PN junction by a distance such that the depletion layer of said PN junction is spread to said ring by said voltage, which voltage is less than the breakdown voltage, and a polycrystalline silicon layer covering an entire surface end of said PN junction, the said field limiting ring and an area of said one major surface where said depletion layer spreads, said polycrystalline silicon layer having a resistivity greater than 10^4 ohms-centimeters, a layer of silicon dioxide overlying said polycrystalline silicon layer, and in which said silicon dioxide layer has a gradually changing oxygen concentration between its top and bottom.

3,971,062
SEMICONDUCTOR ARRANGEMENT

Rolf Merkle, Meimsheim, Germany, assignor to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany

Continuation of Ser. No. 401,008, Sept. 26, 1973, abandoned. This application Aug. 20, 1975, Ser. No. 606,193
Claims priority, application Germany, Sept. 28, 1972, 2247580
Int. Cl.² H01L 23/48, 29/44, 29/46
U.S. Cl. 357—70 **7 Claims**



1. In a semiconductor circuit arrangement including a metal contacting strip which is provided with a plurality of notches and/or recesses which divide said strip into a pattern of spaced connecting parts, including the external leads for the circuit arrangement, for receiving the semiconductor components or their connecting wires, a plurality of semiconductor components mounted on selected ones of said connecting parts, a plurality of connecting wires interconnecting the contact points of said semiconductor components with the contact points of selected ones of said connecting parts to form a desired circuit arrangement, and a housing which encloses said semiconductor wafers, said connecting wires and the portions of said contact strip other than said external leads; the improvement comprising means for providing a bridging connection between two contact points which are spaced relatively far apart whereby relatively short lengths of connecting wire may be utilized, said means including an insulating platelet mounted on and having one surface thereof connected to one of said connecting parts which is situated between said two contact points, a metal coating on the surface of said platelet opposite said one surface, and a pair of connecting wires, each electrically connected between said metal coating and a respective one of said two contact points.

3,971,063

DIGITAL TIME BASE CORRECTOR OSCILLATORS

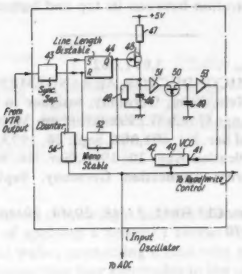
Peter Colin Michael, and Anthony Donald Stalley, both of Newbury, England, assignors to Quantel Limited, England

Filed Mar. 13, 1975, Ser. No. 558,090

Claims priority, application United Kingdom, Mar. 16, 1974, 11793/74

Int. Cl.² H04N 5/76

U.S. Cl. 358—8 4 Claims



1. A digital time base corrector for television equipment comprising:

a. an analogue to digital converter for receiving successive lines of an analogue video signal having horizontal sync pulse information thereon and for converting said signal into digital form,

b. a store for receiving the video information in digital form from the output of the analogue to digital converter,

c. control means for writing in and reading out the digital information in said store,

d. a digital to analogue converter for receiving the stored signal read out from said store,

e. a voltage controlled input oscillator for determining the rate of conversion of said analogue signal into digital form and the rate of writing in of said digital information into said store,

f. a fixed frequency output oscillator for determining the rate of reading out of the digital information from said store and the rate of conversion of the digial information into analogue form,

g. said input oscillator including a triggered oscillator having an input connected to said incoming video signal which triggered oscillator is triggered into oscillation in timed relationship with the incoming horizontal sync pulse information and, including means connected to said triggered oscillator for switching off said triggered oscillator after emission of a predetermined number of oscillations therefrom which are sufficient to cause all the video information in one line to be converted into digital form and stored, and control voltage means operating to develop a voltage which is dependent on the time interval between the switching off of the triggered oscillator after the predetermined number of oscillations and the start of said oscillator on receipt of the sync pulse information at the start of the next line, said triggered oscillator being coupled to said control voltage means to have its frequency varied according to the level of said developed voltage.

3,971,064

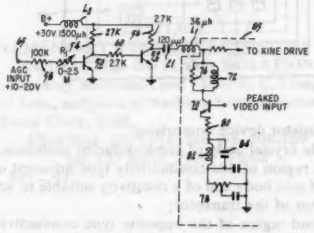
VIDEO DE-PEAKING CIRCUIT IN LUMINANCE CHANNEL IN RESPONSE TO AGC SIGNAL

Edward Marshall Milbourn, Greenfield, Ind., assignor to RCA Corporation, New York, N.Y.

Continuation of Ser. No. 115,304, Feb. 16, 1971, abandoned. This application Jan. 21, 1974, Ser. No. 434,950

Int. Cl.² H04N 9/00

U.S. Cl. 358—38 2 Claims



1. In a color television receiver of the type including signal translating stages for processing radio frequency and intermediate frequency signals, a luminance channel for processing luminance signals, a chrominance channel for processing chrominance signals, an image reproducing kinescope, an output stage coupled between said luminance channel and said image reproducing kinescope and apparatus for developing an AGC voltage to control the gain of said signal translating stages as an inverse function of the amplitude of a received signal, said luminance channel including a peaking circuit for accentuating high frequency components of said luminance signals, the combination therewith of:

means coupled intermediate said luminance channel peaking circuit and said kinescope at said output stage and being also responsive to said AGC voltage but for automatically de-emphasizing said accentuated high frequency components of said luminance signals, also as an inverse function of said received signal amplitude;

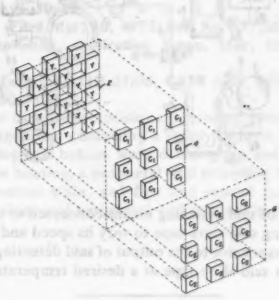
said means being independently operative of said peaking circuit and so configured and arranged that the degree of de-emphasis provided said accentuated high frequency components of said luminance signals increases with decreases in received strength to reduce the presence of higher frequency noise in a reproduced image under weak signal conditions while the degree of de-emphasis provided said accentuated high frequency components of said luminance signals decreases with increases in received signal strength where the signal-to-noise ratio of an incoming signal is correspondingly greater;

said means including an impedance path for bypassing said accentuated high frequency components of said luminance signals away from said image reproducing kinescope, said AGC varying the impedance of said path in the same direction as variations in said received signal strength, said impedance path comprising the series connection of a capacitive and inductive reactance and a variable resistance, said capacitive and inductive reactance being selected so as to pass said accentuated high frequency components of said luminance signals with said resistance being controllably varied in the same direction as variations in said AGC voltage to change the loading of said output stage in the frequency range of said high frequency components of said luminance signals, also as an inverse function of received signal strength.

3,971,065
COLOR IMAGING ARRAY

Bryce E. Bayer, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Mar. 5, 1975, Ser. No. 555,477
Int. Cl.² H04N 9/24
U.S. Cl. 358—41 **11 Claims**

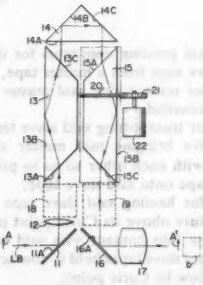


1. A color imaging device comprising an array of light-sensitive elements, which array includes at least (1) a first type of element sensitive to a spectral region corresponding to luminance, (2) a second type of element sensitive to one spectral region corresponding to chrominance, and (3) a third type of element sensitive to a different spectral region corresponding to chrominance, the three types of elements occurring in repeating patterns which are such that over at least a major portion of said array luminance-type elements occur at every other element position along both of two orthogonal directions of said array.

3,971,066
SPECIAL EFFECT GENERATION SYSTEM IN AN IMAGE PICKUP SYSTEM

Kikuo Toda, Tokyo, Japan, assignor to Nippon Educational Television Company, Ltd., Tokyo, Japan

Filed Feb. 11, 1974, Ser. No. 441,567
Claims priority, application Japan, Mar. 1, 1973, 48-24567; Mar. 1, 1973, 48-24568; June 27, 1973, 48-72620; June 27, 1973, 48-72621
Int. Cl.² H04N 9/04; G02B 17/00
U.S. Cl. 358—55 **4 Claims**



1. A special effect generation arrangement for a color television pickup system, comprising:

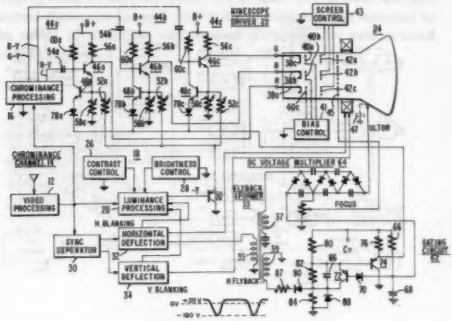
reflection means disposed between a taking lens and a three color split optical device for directing light from said lens to the optical device along a path lying in a plane normal to an axis extending between the lens and the optical device, said reflection means including an even numbered reflecting member integrally disposed with an odd numbered reflecting member; and

means for moving said reflecting members in a direction normal to said plane to selectively introduce said members into the light path thereby permitting variation between normal and inverted states of images conveyed by said light to the optical device.

3,971,067
AUTOMATIC BEAM CURRENT LIMITER

Marvin Neil Norman, Indianapolis, Ind., assignor to RCA Corporation, New York, N.Y.

Filed May 23, 1975, Ser. No. 580,356
Int. Cl.² H04N 9/52
U.S. Cl. 358—74 **14 Claims**



1. In a system for processing television video signals, said signals including chrominance, luminance and synchronizing signals, said system including a luminance channel for processing said luminance signals, a chrominance channel for deriving color difference signals from said chrominance signals, an image reproducing device, high voltage supplying means for providing operating potential for said image reproducing device, and deflection means responsive to said synchronizing signals for scanning said device in a regular pattern including trace and retrace intervals, an apparatus comprising:

means for deriving a control voltage representing the magnitude of current drawn by said image reproducing device from said high voltage supplying means;

amplifying means for combining said luminance signals and said chrominance signals to derive color signals, said amplifying means coupling said color signals to said image reproducing device;

clamping means coupled to said amplifying means for clamping a predetermined circuit point of said amplifying means to said control voltage and thereby control the operating point of said amplifying means, said operating point being controlled so as to reduce the amplitude of said color signals in direct relationship to the magnitude of said current drawn by said image reproducing device.

3,971,068
IMAGE PROCESSING SYSTEM

Lester A. Gerhardt, Elnora; Nelson R. Corby, Jr., and Edward M. Sims, both of Troy, all of N.Y., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 22, 1975, Ser. No. 607,081
Int. Cl.² H04N 9/02
U.S. Cl. 358—82 **8 Claims**

1. An image processing system comprising, in combination

a first and second source of video signals which represent one or more images,

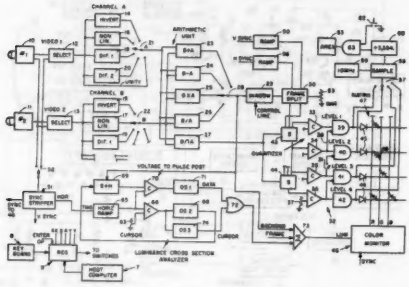
each of said sources producing a signal sequence which duplicates the format generated by a television camera

so that appropriate vertical and horizontal sync pulses are included therein;

means for subjecting the video signals from both sources to a preliminary wave shaping operation which involves unity gain, logarithmic amplification or differentiation so as to produce first and second modified video signals;

means for performing a preselected arithmetic operation with said first and second modified video signals which involves addition, subtraction, multiplication or division so as to produce processed video signals;

means for comparing the amplitude of said processed video signals to a plurality of successively higher threshold levels and for developing quantized signals which correspond to the number of threshold levels that are exceeded by said processed video signals;



means for combining selected ones of said quantized signals to form first, second and third encoded signals which designate those corresponding processed video signals that exceed predetermined combinations of said threshold levels;

a monitor adapted to provide a color television type display on its screen,

said monitor being synchronized by the horizontal and vertical sync pulses from said sources and having three electron guns adapted to produce a like number of different colors on said screen; and

means for coupling said first, second and third encoded signals to different ones of said electron guns thereby to form on the screen of said monitor a color encoded image.

3,971,069

THERMAL PRINTING APPARATUS

Ichiro Hanai, Ichikawa; Toshiharu Kobayashi, and Kazuo Takahashi, both of Tokyo, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Nov. 18, 1974, Ser. No. 524,957

Claims priority, application Japan, Nov. 27, 1973, 48-133274

Int. Cl.² G11B 5/86

U.S. Cl. 360—16 **9 Claims**

1. A thermal printing apparatus comprising:

a slave tape;

a master tape;

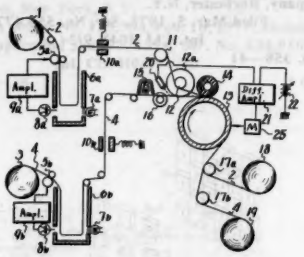
means transporting the master tape;

heating means mounted adjacent said slave tape for heating said tape above its Curie point before printing;

means for bringing said slave tape into contact with said master tape and maintaining said tapes in contact until the slave tape cools substantially below its Curie temperature;

a temperature detecting means mounted adjacent means for bringing said slave tape into contact with said master tape to detect the temperature of said slave tape;

means for driving said slave tape relative to said heating means; and



the output of said detecting means connected to said means for driving said slave tape to vary its speed and said drive means responsive to the output of said detecting means to maintain said slave tape at a desired temperature.

3,971,070

HEATING MEANS FOR HEATING A MAGNETIC TAPE ABOVE ITS CURIE POINT PRIOR TO DUPLICATION BY CONTACT WITH A MASTER TAPE

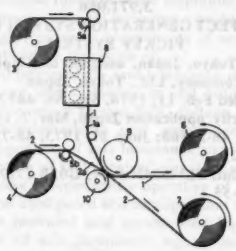
Ichiro Hanai, Ichikawa; Toshiharu Kobayashi, and Kazuo Takahashi, both of Tokyo, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Sept. 25, 1974, Ser. No. 509,308

Claims priority, application Japan, Oct. 1, 1973, 48-110339

Int. Cl.² G11B 5/86

U.S. Cl. 360—16 **5 Claims**



1. A thermal printing apparatus for duplicating magnetic data on a slave tape from a master tape, comprising:

a. means for transporting said master tape on which said data is recorded;

b. means for transporting said slave tape;

c. means for bringing said master and slave tapes into contact with each other so as to print said data on said master tape onto said slave tape;

d. means for heating said slave tape to a predetermined temperature above its Curie point prior to bringing said slave tape into contact with said master tape and said master and slave tapes held in contact until said slave tape cools below its Curie point;

e. a housing substantially enclosing said heating means and formed with a slot into which said slave tape is received such that when in said slot it is heated by said heating means, and

f. means for moving said heating means relative to said housing to a first position so that said slave tape and said heating means are separated so that said slave tape is not heated by said heating means and to a second position

where said slave tape is heated by said heating means within said housing.

3,971,071

TAPE CASSETTE WITH GUIDE MEANS FOR UNIDIRECTIONAL INSERTION AND HOLDER THEREFORE

Kiyoshi Urayama, Sendai, Japan, assignor to Sony Corporation, Tokyo, Japan

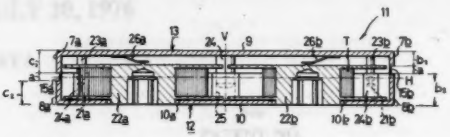
Filed Mar. 10, 1975, Ser. No. 557,069

Claims priority, application Japan, Mar. 11, 1974, 49-28128[U]

Int. Cl.² G11B *23/08*; G03B *1/04*, *23/02*

U.S. Cl. 360—132 **12 Claims**

1. A tape cassette comprising a housing of generally rectangular configuration containing a supply of tape; said housing including top and bottom walls defining top and bottom surfaces of the housing, a perpheral wall extending between said top and bottom walls, and first and second guiding means extending along said peripheral wall at opposite sides, respectively, of said housing, each of said first and second guiding means having upper and lower guiding surfaces which are substantially parallel with, and at predetermined first and second distances from said top and bottom surfaces, respectively, of the housing, said first and second distances from said



top and bottom surfaces of the housing to said upper and lower guiding surfaces, respectively, of at least one of said guiding means being unequal, and at least one of said first and second distances for said first guiding means being unequal to the other of said first and second distances for said second guiding means.

4,071,671

TAPE CASSETTE WITH GUIDE MEANS FOR UNIFORM TRANSVERSE DEFLECTION AND HOLDER THEREFOR

Kiyoshi Tsutsui, Kyoto, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Mar. 10, 1975, Ser. No. 557,069

Claims priority, application Japan, Mar. 11, 1974, 49-28810[U]

Int. Cl.[2] G11B 23/04, G03B 1/04, 21/02

U.S. Cl. 360—132 12 Claims

1. A type cassette comprising a housing provided with a plate configuration containing a supply storage and housing including top and bottom walls defining an opening in one face of the housing, a tape-like web extending between said top and bottom walls, and first and second guiding means extending along said opening in said one face, each

DESIGN PATENTS

GRANTED JULY 20, 1976

ERRATA

For CLASS	See PATENT NO.
033–009 D	240,573
008–047	240,598
008–271	240,599
025–010	240,617
016–002	240,664
016–021	240,665

DESIGN PATENTS

GRANTED JULY 20, 1976

ERRATA

Pat- CLASS	Pat- PATENT NO.
033–009 D	240,573
008–047	240,598
008–271	240,599
025–010	240,617
016–002	240,664
016–021	240,665

DESIGNS

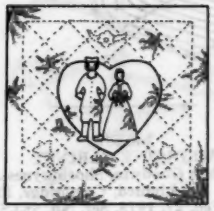
JULY 20, 1976

240,570
KNITTED SLIPPER
Esther C. Karna, 1996 Camino al los Cerros, Menlo Park, Calif. 94025
Filed Sept. 12, 1974, Ser. No. 505,589
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—282

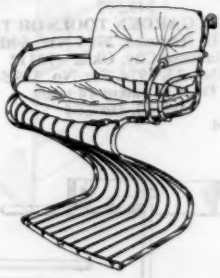
240,571
BASEBALL GLOVE
James Robert McTear, 32 Squadron Line, Simsbury, Conn. 06070
Filed Apr. 2, 1975, Ser. No. 564,521
Term of patent 14 years
Int. Cl. D2—*06*
U.S. Cl. D2—361

240,572
BELT-ATTACHED TOOL HOLDER
Paul E. Worsham, 3433 Calvin Ave., San Jose, Calif. 95124
Filed Dec. 9, 1974, Ser. No. 530,513
Term of patent 14 years
Int. Cl. D2—*07*
U.S. Cl. D2—400

240,573
QUILTED FABRIC APPLIQUE BLOCK
Mary Louise Brion, 415 High St., Bethlehem, Pa. 18018
Filed Apr. 25, 1974, Ser. No. 464,139
Term of patent 14 years
Int. Cl. D5—*04*
U.S. Cl. D33—9 D



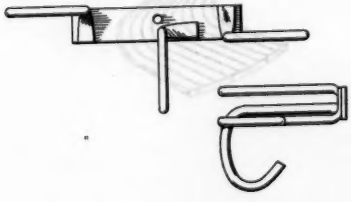
240,574
ARMCHAIR
Giorgio Rinaldi, Via Tombelle 9, Saonara, Padova, Italy
Filed Nov. 25, 1974, Ser. No. 526,752
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—70



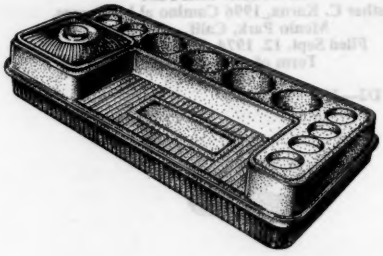
240,575
CHAIR
Giorgio Rinaldi, Via Tombelle 9, Saonara, Padova, Italy
Filed Oct. 11, 1974, Ser. No. 513,973
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—76

240,576
MEDICINE CABINET
William Jonathan Goodwin, Shoeburyness, England, assignor to Pye Limited, Cambridge, England
Filed Feb. 27, 1975, Ser. No. 553,535
Claims priority, application Great Britain Aug. 30, 1974
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—104

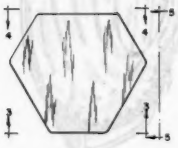
240,577
SUPPORT FOR GARDEN TOOLS OR THE LIKE
Fred D. Newman, 2708 NW. 60th, Oklahoma City, Okla. 73112
Filed Dec. 23, 1974, Ser. No. 535,547
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—114



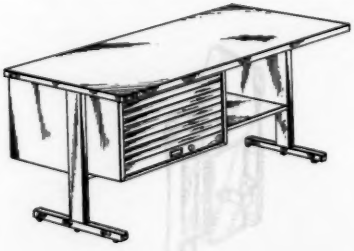
240,578
PORTABLE BAR
Marten Gottsegen, 1212 Lake Shore Drive, Chicago, Ill. 61610
Filed July 29, 1974, Ser. No. 492,773
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—144



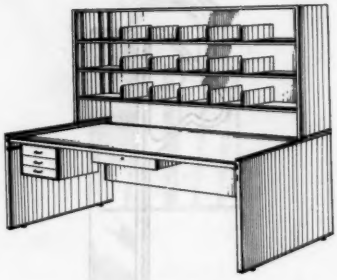
240,579
STORAGE CABINET FOR MAGNETIC TAPES OR OTHER SIMILAR ARTICLES
John Bower, Shelby, N.C., assignor to American Greetings Corporation
Filed May 1, 1974, Ser. No. 465,872
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—149



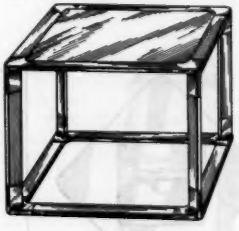
240,580
WORK TABLE OR SIMILAR ARTICLE
George W. Podell, Newburgh, N.Y., assignor to Monarch Metal Products, Inc., New Windsor, N.Y.
Filed Feb. 28, 1975, Ser. No. 554,302
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—150



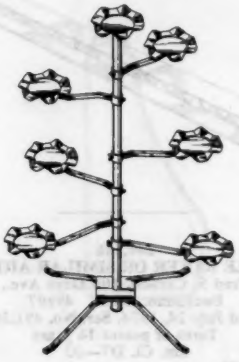
240,581
WORK STATION
Jan N. Ostborg, Ballwin, and Philip K. Bevelacqua, St. Ann, Mo., and Richard L. Hirsch, Collinsville, Ill., assignors to Harvard Industries, Inc.
Filed Aug. 15, 1974, Ser. No. 497,764
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—161



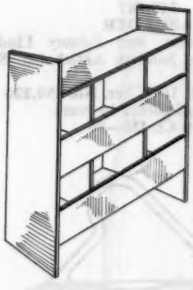
240,582
TABLE
Ira Friedman, Somerset, N.J., assignor to Rowe Furniture Corporation, Arlington, Va.
Filed Apr. 10, 1975, Ser. No. 567,020
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—177



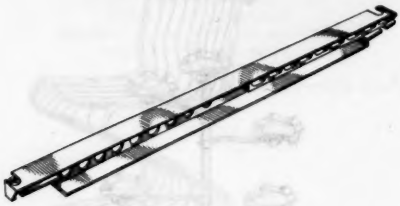
240,583
STAND FOR POTTED PLANTS AND THE LIKE
Michael Bohomoletz, R.D. 3, Box 312, Perrineville Road, Robbinsville, N.J. 08691
Filed June 11, 1975, Ser. No. 586,098
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—183



240,584
SHELF UNIT OR SIMILAR ARTICLE
John McGrann, 5851A Lincoln, Morton Grove, Ill. 60053
Filed Nov. 16, 1973, Ser. No. 416,634
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—186



240,585
GUIDE FOR A DRAWER
Edward L. Kaplan, Northbrook, and Gerhard Cless, Skokie, Ill., assignors to Kenneth H. Gutner
Filed Aug. 23, 1974, Ser. No. 500,145
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—191

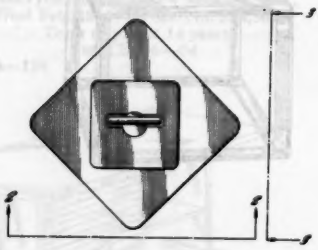


240,586
WAFFLE BAKER OR SIMILAR ARTICLE
Fred S. Carbon, 105 Days Ave., Buchanan, Mich. 49107
Filed July 24, 1974, Ser. No. 491,362
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—88

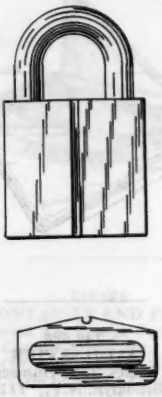
240,587
ABRADER
Hans Franzen, Vendelso, and Johnny Lind, Alvsjo, Sweden, assignors to Sandvik Aktiebolag, Sandviken, Sweden
Filed May 23, 1975, Ser. No. 580,226
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—90

240,588
ABRADER
Hans Franzen, Vendelso, and Johnny Lind, Alvsjo, Sweden, assignors to Sandvik Aktiebolag, Sandviken, Sweden
Filed May 23, 1975, Ser. No. 580,227
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—90

240,589
ROTATABLE LOCKING JOINT
Lonnie D. Cooper, Hawthorne, Calif., assignor to Revell, Incorporated, Venice, Calif.
Filed Sept. 23, 1974, Ser. No. 508,106
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—108



240,590
PADLOCK
Edward Herman Meisner, Wyckoff, N.J., assignor to Eaton Corporation
Filed Oct. 29, 1974, Ser. No. 518,917
Term of patent 14 years
Int. Cl. D8—*07*
U.S. Cl. D8—114



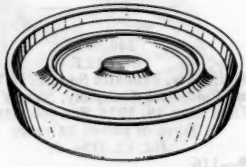
240,591
JAR
Edward J. Kretz, Toledo, Ohio, assignor to Owens-Illinois, Inc.
Filed May 16, 1974, Ser. No. 470,530
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—1

240,592
BOTTLE
Victor Koenigsberg, Franklin Square, N.Y., assignor to Colgate-Palmolive Company, New York, N.Y.
Filed Apr. 10, 1975, Ser. No. 566,899
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—61

240,593
BOTTLE
Victor Koenigsberg, Franklin Square, N.Y., assignor to Colgate-Palmolive Company, New York, N.Y.
Filed Mar. 19, 1975, Ser. No. 559,907
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—116

240,594
BOTTLE
Victor Koenigsberg, Franklin Square, N.Y., assignor to Colgate-Palmolive Company, New York, N.Y.
Filed Mar. 24, 1975, Ser. No. 561,597
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—143

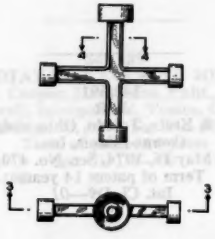
240,595
CONTAINER CLOSURE
Elmer E. Kress, 933B Heritage Village, Southbury, Conn. 06488
Filed Mar. 25, 1974, Ser. No. 454,230
Term of patent 14 years
Int. Cl. D9—*07*
U.S. Cl. D9—164



240,596
METERED DISPENSING CONTAINER
Frank E. Brown, Burbank, Calif., assignor to SmithKline Corporation, Philadelphia, Pa.
Filed Jan. 24, 1975, Ser. No. 543,806
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—169

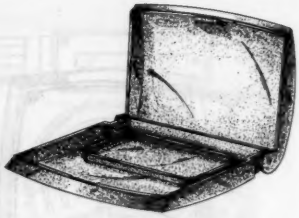
240,597
COMBINED PACKAGING TRAY AND COVER
Karl Rune Persson, Halmstad, Sweden, assignor to Duni Bila AB, Halmstad, Sweden
Filed Mar. 6, 1974, Ser. No. 448,696
Claims priority, application Sweden Sept. 10, 1973
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—219

240,598
STUD SETTER
Harold Isaacs, 2750 Homecrest Ave., Brooklyn, N.Y. 11235
Filed Feb. 18, 1975, Ser. No. 550,819
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—47



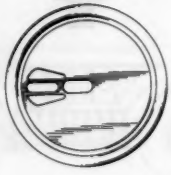
240,599
MOLDED WALL FASTENER
Alan J. Solo, Brooklyn, N.Y., assignor to Knock-N-Lok International, Inc., Brooklyn, N.Y.
Filed Jan. 8, 1975, Ser. No. 539,275
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—271

240,600
HINGED BOX
Donald K. Takacs, Wheaton, Ill., assignor to Richardson-Merrell Inc., Wilton, Conn.
Filed Jan. 7, 1975, Ser. No. 539,112
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—231

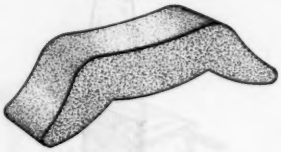


240,601
CONTAINER END PANEL
Fred C. Newman, La Grange Park, Ill., assignor to Continental Can Company, Inc., New York, N.Y.
Filed Oct. 11, 1974, Ser. No. 514,038
Term of patent 14 years
Int. Cl. D9—*99*
U.S. Cl. D9—253

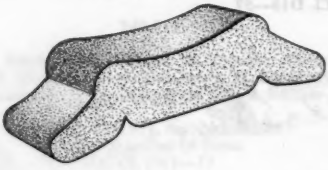
240,602
CONTAINER END PANEL
Fred C. Newman, La Grange Park, Ill., assignor to Continental Can Company, Inc., New York, N.Y.
Filed Oct. 11, 1974, Ser. No. 514,046
Term of patent 14 years
Int. Cl. D9—*99*
U.S. Cl. D9—253



240,603
LOOSE FILL PACKING ELEMENT
Harry Bussey, Jr., P.O. Box 115, Serpentine Road, Navesink, N.J. 07752
Filed Jan. 30, 1975, Ser. No. 545,561
Term of patent 14 years
Int. Cl. D9—*99*
U.S. Cl. D9—294



240,604
LOOSE FILL PACKING ELEMENT
Harry Bussey, Jr., P.O. Box 115, Serpentine Road, Navesink, N.J. 07752
Filed Jan. 30, 1975, Ser. No. 545,567
Term of patent 14 years
Int. Cl. D9—*99*
U.S. Cl. D9—294

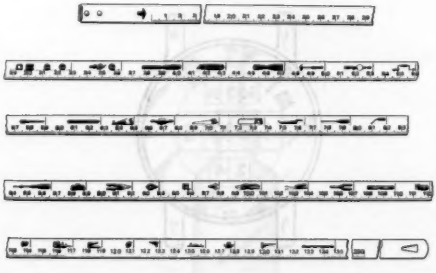


240,605
WATCH
William Sticker, Hastings House 2A, Hastings-on-Hudson, N.Y. 10706
Filed Dec. 26, 1974, Ser. No. 536,574
Term of patent 14 years
Int. Cl. D10—*02*
U.S. Cl. D10—38

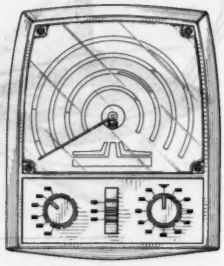
240,606
HAND HELD OPTICAL CHARACTER RECOGNITION SCANNING UNIT
Robert B. Koenig, Dallas, Tex., assignor to Recognition Equipment Incorporated, Irving, Tex.
Filed Sept. 26, 1974, Ser. No. 509,712
Term of patent 14 years
Int. Cl. D10—*07*
U.S. Cl. D10—46

240,607
LIQUID CRYSTAL CONVERTER THERMOMETER
Neil R. Riley, Livermore, Calif., assignor to Thermoptics, Inc., Livermore, Calif.
Filed Oct. 4, 1974, Ser. No. 512,216
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—57

240,608
TAPE MEASURE BLADE
Michel Quenot, Besancon, France, assignor to Stanley-Mabo
Filed Mar. 12, 1974, Ser. No. 450,396
Claims priority, application France Oct. 1, 1973
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—71

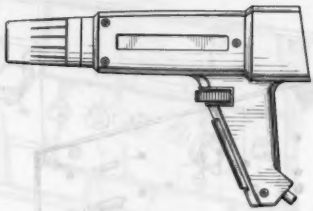


240,609
IGNITION ANALYZER
Edwin L. Schwartz, Los Angeles, Calif., assignor to Rite Autotronics Corporation
Filed Nov. 6, 1974, Ser. No. 521,364
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—78



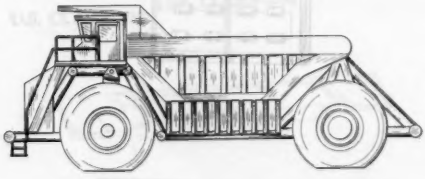
240,610
COMBINED ENGINE ANALYZER AND TIMING LIGHT
Edwin L. Schwartz, Los Angeles, Calif., assignor to Rite Autotronics Corporation
Filed Nov. 6, 1974, Ser. No. 521,365
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—78

240,611
COMBINED TACHOMETER, ADVANCE METER AND TIMING LIGHT
Edwin L. Schwartz, Los Angeles, Calif., assignor to Rite Autotronics Corporation
Filed Nov. 18, 1974, Ser. No. 524,475
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—78

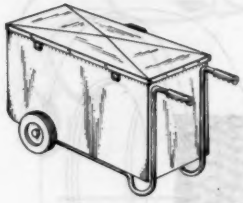


240,612
WEIGHT
Harry C. Becker, 190 Broadview Ave., New Rochelle, N.Y. 10804
Filed Jan. 8, 1975, Ser. No. 539,540
Term of patent 14 years
Int. Cl. D10—*07*
U.S. Cl. D10—94

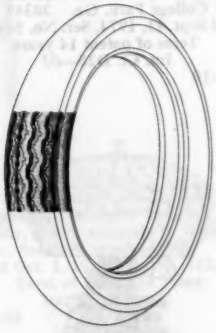
240,613
MATERIAL HAULING AND DUMPING VEHICLE
Richard L. Thomas, Billy M. Lewis, Francis A. Bartley, Walter I. Myers, and Edgar R. Goodbary, Tulsa, Okla., assignors to Goodbary Engineering Co.
Filed Nov. 22, 1974, Ser. No. 526,315
Term of patent 14 years
Int. Cl. D12—*08*
U.S. Cl. D12—15



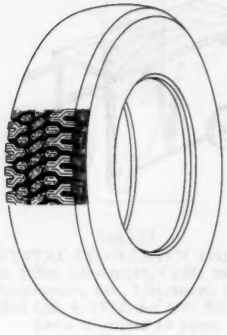
240,614
REFUSE CAN STORAGE UNIT
Samuel Paterno, Des Moines, Iowa, assignor to Paterno Enterprises, Des Moines, Iowa
Filed Jan. 29, 1975, Ser. No. 544,938
Term of patent 14 years
Int. Cl. D12—*02*
U.S. Cl. D12—33



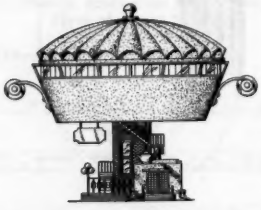
240,615
TIRE
David C. Kleeb, Kent, Charles W. Roberts, Akron, William M. Hopkins, Kent, and James D. Glenn, Akron, Ohio, assignors to The Goodyear Tire & Rubber Company
Filed Dec. 23, 1974, Ser. No. 535,897
Term of patent 14 years
Int. Cl. D12—*15*
U.S. Cl. D12—142



240,616
TIRE
Chester J. Gasowski, North Canton, and Dennis B. Granger, Norton, Ohio, John A. Hutz, Orlando, Fla., and Terrence M. Ruip, Akron, Ohio, assignors to The Goodyear Tire & Rubber Company
Filed Jan. 23, 1975, Ser. No. 543,398
Term of patent 14 years
Int. Cl. D12—*15*
U.S. Cl. D12—146

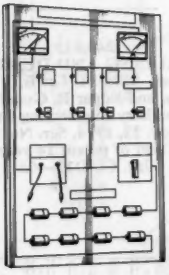


240,617
BUILDING
A. F. R. Svensson, 5655 Old National Highway, College Park, Ga. 30349
Filed Sept. 11, 1974, Ser. No. 504,865
Term of patent 14 years
Int. Cl. D25—*03*
U.S. Cl. D25—10

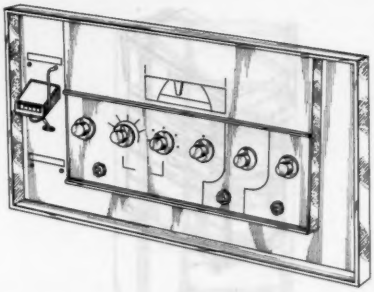


240,618
CONDUCTOR EDUCATIONAL BOARD
Douglas C. Covert, Royal Oak, Mich., assignor to Xerox Corporation, Stamford, Conn.
Filed Dec. 27, 1973, Ser. No. 428,646
Term of patent 14 years
Int. Cl. D19—*07*
U.S. Cl. D19—62

240,619
BATTERY OVERLOAD EDUCATIONAL BOARD
Jack N. Holcomb, Fort Lauderdale, Fla., assignor to National Intelligence Academy
Filed Oct. 15, 1974, Ser. No. 514,901
Term of patent 14 years
Int. Cl. D19—*07*
U.S. Cl. D19—64

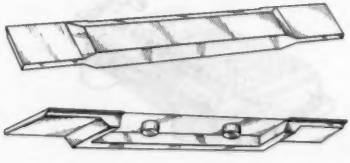


240,620
AUDIO-FILTER EDUCATIONAL BOARD
Jack N. Holcomb, Fort Lauderdale, Fla., assignor to National Intelligence Academy
Filed Oct. 15, 1974, Ser. No. 514,900
Term of patent 14 years
Int. Cl. D19—*07*
U.S. Cl. D19—64



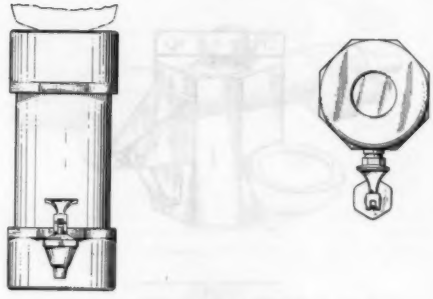
240,621
COMBINED CLIP BOARD AND TIMER
Philip M. Houser, 4445 Pacific Coast Highway, Apt. 1202, Torrance, Calif. 90505
Filed June 24, 1974, Ser. No. 481,990
Term of patent 14 years
Int. Cl. D19—*02*
U.S. Cl. D19—88

240,622
INDEXING TAB
Kenneth E. Thornton, Rte. 1, Box 345, Colton, Oreg. 97017
Filed Sept. 27, 1974, Ser. No. 510,044
Term of patent 14 years
Int. Cl. D19—*99*
U.S. Cl. D19—99



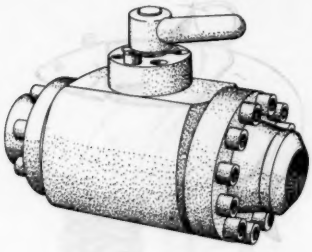
240,623
ARTIFICIAL FISHING LURE
Bingham A. McClellan, Traverse City, Mich., assignor to McClellan Industries, Inc., Traverse City, Mich.
Filed May 8, 1975, Ser. No. 575,637
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—27

240,624
PORTABLE WATER PURIFIER
Harry Grant MacMurray, 900 NE. 45th St., Apt. 74, Pompano Beach, Fla. 33064
Filed May 10, 1974, Ser. No. 468,823
Term of patent 3½ years
Int. Cl. D23—*01*
U.S. Cl. D23—3

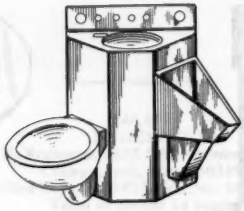


240,625
FLUSHING VALVE FOR AN IRRIGATION SYSTEM
Frank R. Anderson, Hacienda Heights, and Albert J. Castro, Cudahy, Calif., assignors to Westates Space-Era Products, Inc., South El Monte, Calif.
Filed Oct. 2, 1974, Ser. No. 511,459
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—19

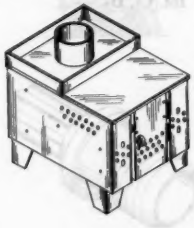
240,626
BALL VALVE
William J. Baker, Orange, Calif., assignor to Armco Steel Corporation, Middletown, Ohio
Filed Apr. 23, 1975, Ser. No. 570,806
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—19



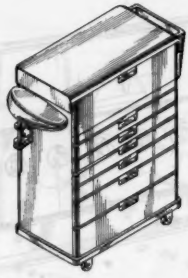
240,627
COMBINATION LAVATORY, TOILET AND URINAL
Earl L. Morris, Whittier, Calif., assignor to Acorn Engineering, City of Industry, Calif.
Filed Mar. 10, 1975, Ser. No. 557,023
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D23—49



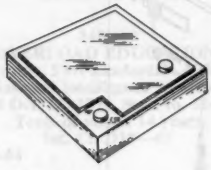
240,628
HEATING STOVE
Alexander T. Kapustin, 4602 Park Blvd., Oakland, Calif. 94602
Filed Nov. 21, 1974, Ser. No. 525,760
Term of patent 14 years
Int. Cl. D23—*03*
U.S. Cl. D23—93



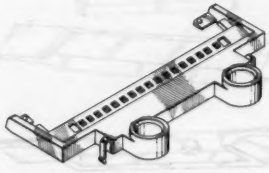
240,629
DENTAL ARM REST CABINET
Raymond Cope, 4285 3rd Ave. S. (or P.O. Box 31053), Birmingham, Ala. 35222
Filed Jan. 29, 1975, Ser. No. 545,178
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D24—1 B



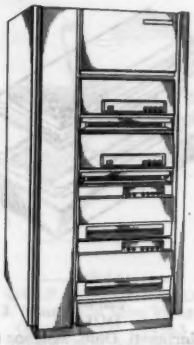
240,630
SILICON SOLAR CELL
Toshinobu Matsutani, Osaka, Japan, assignor to Sharp Kabushiki Kaisha (Sharp Corporation)
Filed July 26, 1974, Ser. No. 492,256
Claims priority, application Japan Feb. 1, 1974
Term of patent 14 years
Int. Cl. D13—*02*
U.S. Cl. D26—1 R



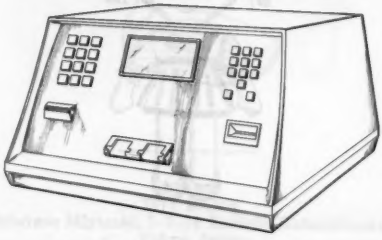
240,631
INTERCONNECTING MEMBER FOR ELECTRICALLY AND MECHANICALLY CONNECTING THE DISPLAY BOARD OF A MICROELECTRONIC CALCULATOR TO THE MAIN LOGIC CIRCUIT BOARD THEREOF
Roger D. Lang, 5175 Thorntree, Irvine, Calif. 92664; Philip J. Thomas, 3952 Patrick Henry Place, Agoura, Calif. 91301; and John A. McAllister, 26661 Las Tunas, Mission Viejo, Calif. 92675
Filed Jan. 27, 1975, Ser. No. 544,381
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D26—1 A



240,632
CABINET FOR ELECTRONIC EQUIPMENT
Robert Edward Kalvitis and Donald Agnew Robertson, Fairport, N.Y., assignors to Xerox Corporation, Stamford, Conn.
Filed July 29, 1974, Ser. No. 492,386
Term of patent 14 years
Int. Cl. D18—*01*
U.S. Cl. D26—5 C



240,633
BANKING MACHINE TERMINAL
Herbert H. Haufler, Richardson, Tandy P. Watson, Grand Prairie, and Edward H. McCauley, Dallas, Tex., assignors to Docutel Corporation, Dallas, Tex.
Filed Oct. 31, 1974, Ser. No. 519,587
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D26—5 C



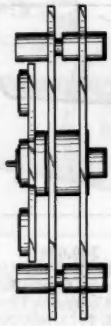
240,634
ELECTRONIC CALCULATING MACHINE
Shigetoshi Hazama, Osaka, Japan, assignor to Sharp Kabushiki Kaisha (Sharp Corporation)
Filed Nov. 20, 1974, Ser. No. 525,346
Claims priority, application Japan June 25, 1974
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D26—5 C

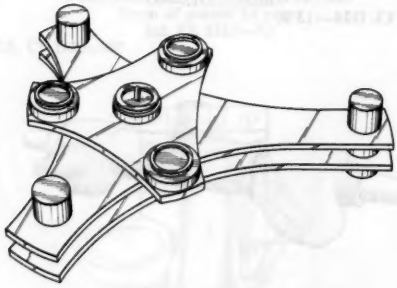
240,635
HAND-HELD OPTICAL CODE SCANNER OR SIMILAR ARTICLE
Thomas A. Peterson, Dayton, Ohio, assignor to Monarch Marking Systems, Inc., Dayton, Ohio
Filed Dec. 6, 1974, Ser. No. 530,256
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D26—5 C

240,636
ENCAPSULATED VACUUM SWITCH
Harold Dennis Haubein, Centralia, Mo., assignor to A. B. Chance Company, Centralia, Mo.
Filed Mar. 28, 1975, Ser. No. 563,141
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D26—13 R

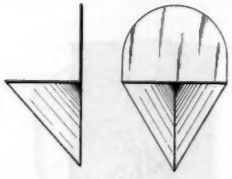
240,637
SPEAKER CABINET
Robert A. O'Neil, Glen Ellyn, Ill., assignor to The Seeburg Corporation of Delaware, Chicago, Ill.
Filed Aug. 21, 1974, Ser. No. 499,166
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D26—14 G

240,638
RECORD TURNTABLE UNIT
Nigel Mark Hobden, Leamington Spa, Kenneth Freivokh, London; Michael Taylor and Ronald David Carter, Warwick, and Ira Dennis Gale, London, England, assignors to Gale Electronics & Design Limited, London, England
Filed Apr. 23, 1975, Ser. No. 570,761
Claims priority, application Great Britain Oct. 25, 1974
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D26—14 D

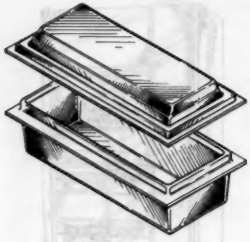




240,639
ASHTRAY LINING
Alf Borje Magnusson, Goteborg, Sweden, assignor to Bengt Petersson New Products Investment AB
Filed Dec. 9, 1974, Ser. No. 531,109
Claims priority, application Sweden June 14, 1974
Term of patent 14 years
Int. Cl. D27—*03*
U.S. Cl. D27—8



240,640
BURIAL VAULT LINER
Robert E. Clark, Rocky Mount, and Arlen G. Harris, Winston-Salem, N.C., assignors to Electronic Data Controls Corporation, Winston-Salem, N.C.
Filed Jan. 13, 1975, Ser. No. 540,324
Term of patent 14 years
Int. Cl. D31—*00*
U.S. Cl. D31—1



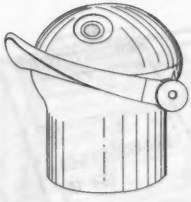
240,641
DOLL
Linda Haupt, Cincinnati, Ohio, assignor to General Mills Fun Group, Inc., Minneapolis, Minn.
Filed Oct. 7, 1974, Ser. No. 512,569
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—4 R

240,642
GOLF PUTTER HEAD
James J. Manfrin, 4 Mira Monte Road, Orinda, Calif. 94563
Filed July 10, 1974, Ser. No. 487,098
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 GH

240,643
GOLF PUTTER HEAD
James J. Manfrin, 4 Mira Monte Road, Orinda, Calif. 94563
Filed July 10, 1974, Ser. No. 487,407
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 GH

240,644
GOLF PUTTER HEAD
James J. Manfrin, 4 Mira Monte Road, Orinda, Calif. 94563
Filed July 10, 1974, Ser. No. 487,408
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 GH

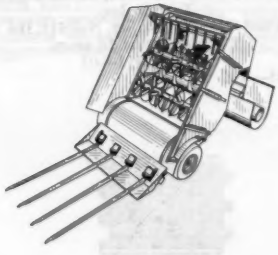
240,645
TOY BANK
Sadayasu Miyazaki, 7–9–10 Tateishi, Katsushika-ku, Tokyo, Japan
Filed Jan. 6, 1975, Ser. No. 538,860
Term of patent 14 years
Int. Cl. D31—*00*
U.S. Cl. D34—11 R



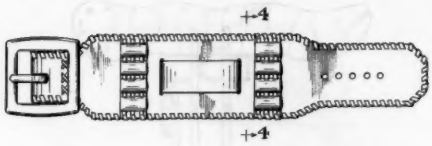
240,646
WORM PUZZLE TOY
Charles B. Root, Mechanicsville, Md., assignor to Educational Design Associates
Filed Dec. 17, 1974, Ser. No. 533,543
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 M

240,647
WORM PUZZLE TOY
Charles B. Root, Mechanicsville, Md., assignor to Educational Design Associates
Filed Dec. 17, 1974, Ser. No. 533,544
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 M

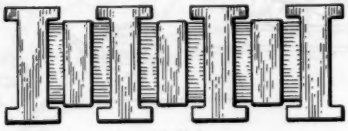
240,648
MACHINE FOR PROCESSING CROP STACKS
Allen Andrew White, Peabody, and Ray Addison Adee, Ronald Henry Knopp, and Bruce Lynn White, Newton, Kans., assignors to Hesston Corporation, Hesston, Kans.
Filed Dec. 19, 1974, Ser. No. 534,909
Term of patent 14 years
Int. Cl. D15—*03*
U.S. Cl. D40—1 E



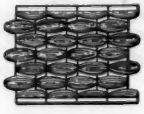
240,649
WRIST WATCH STRAP
Theodore L. Ashworth, 2128 N. Lynhurst, Apt. B, Indianapolis, Ind. 46224
Filed Aug. 28, 1974, Ser. No. 501,230
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D45—4 E



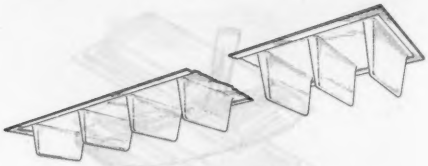
240,650
EXPANSIBLE LINK CHAIN FOR A BRACELET OR SIMILAR ARTICLE
Murray L. Cowan, Norwood, Mass., assignor to Textron Inc.
Filed Sept. 27, 1974, Ser. No. 509,792
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D45—4 E



240,651
CHAIN FOR A BRACELET OR SIMILAR ARTICLE
Murray L. Cowan, Norwood, Mass., assignor to Textron Inc.
Filed Oct. 2, 1974, Ser. No. 511,386
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D45—4 E

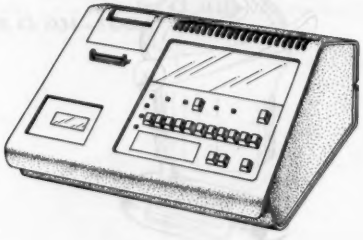


240,652
LIGHT DIFFUSER
Wilfred W. Wilson, 1055 Bloor St. E., Penthouse 12, Mississauga, Ontario, Canada
Filed Apr. 11, 1975, Ser. No. 567,270
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D48—16 A



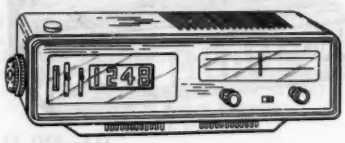
240,653
LIGHTING FIXTURE
Zia Eftekhar, Glendale, Calif., assignor to Lightolier Incorporated, Jersey City, N.J.
Filed June 20, 1975, Ser. No. 588,802
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D48—23 R

240,654
CASH REGISTER
Takanki Dobashi and Toshio Kurokawa, Kawasaki, Japan, assignors to Fuji Electric Co., Ltd., Kawasaki, Japan
Filed Dec. 2, 1974, Ser. No. 528,618
Claims priority, application Japan Aug. 7, 1974
Term of patent 14 years
Int. Cl. D20—*02*
U.S. Cl. D52—4 A

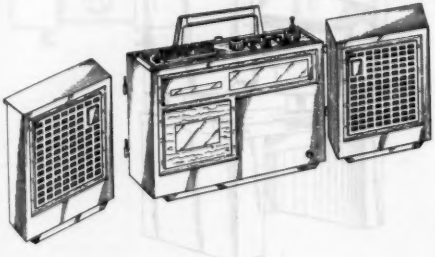


240,655
RADIO
Shogo Imai, Osaka, Japan, assignor to Sharp Kabushiki Kaisha (Sharp Corporation)
Filed May 9, 1974, Ser. No. 468,395
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D56—4 B

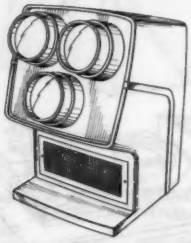
240,656
CLOCK RADIO
Shogo Imai, Osaka, Japan, assignor to Sharp Kabushiki Kaisha (Sharp Corporation)
Filed May 9, 1974, Ser. No. 468,462
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D56—4 B



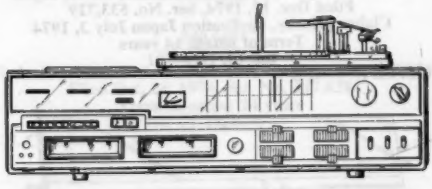
240,657
COMBINED RADIO, CASSETTE RECORDER AND SPEAKERS
Yutaka Sugawara, Kanagawa, Japan, assignor to Superscope, Inc., Chatsworth, Calif.
Filed May 22, 1974, Ser. No. 472,433
Term of patent 14 years
Int. Cl. D14—*01, 03*
U.S. Cl. D56—4 B



240,658
COMBINED TELEVISION RECEIVER AND PROJECTOR
David E. Roche, Nashua, N.H., assignor to Advent Corporation, Cambridge, Mass.
Filed Aug. 9, 1974, Ser. No. 496,049
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D56—4 D

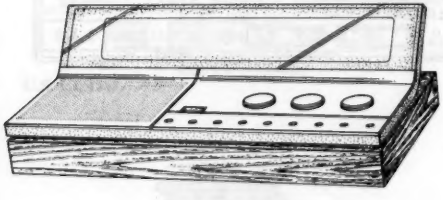


240,659
COMBINED PHONOGRAPH, RADIO AND CARTRIDGE RECORDER AND PLAYER
Minol Araki, Tokyo, Japan, assignor to Yorx Corporation, Englewood Cliffs, N.J.
Filed Nov. 8, 1974, Ser. No. 522,138
Term of patent 14 years
Int. Cl. D14—*01, 03*
U.S. Cl. D56—4 R

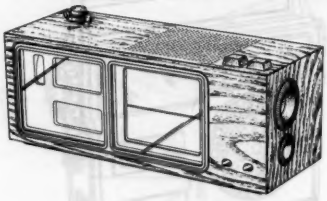


240,660
COMBINED PHONOGRAPH AND CARTRIDGE PLAYER
Leonard Kaye, Westfield, N.J., assignor to Capehart Corporation, New York, N.Y.
Filed Nov. 25, 1974, Ser. No. 526,522
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D56—4 R

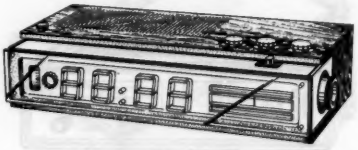
240,661
DIGITAL CLOCK RADIO
Tomio Fujiwara, Osaka, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Kadoma, Osaka, Japan
Filed Dec. 17, 1974, Ser. No. 533,729
Claims priority, application Japan July 3, 1974
Term of patent 14 years
Int. Cl. D10—*01*
U.S. Cl. D56—4 B



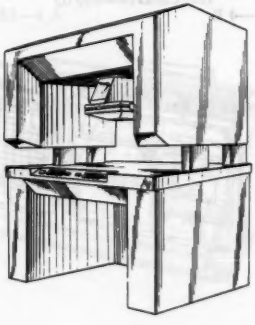
240,662
DIGITAL CLOCK RADIO
Kunio Hoshino, Kadoma, Osaka, and Benito Mishiro, Sakai, Osaka, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Osaka, Japan
Filed Dec. 17, 1974, Ser. No. 533,732
Claims priority, application Japan July 19, 1974
Term of patent 14 years
Int. Cl. D10—*01*
U.S. Cl. D56—4 B



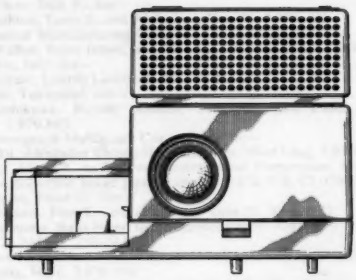
240,663
DIGITAL CLOCK RADIO
Masanori Hamada, Moriguchi, Osaka, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Kadoma, Osaka, Japan
Filed Dec. 18, 1974, Ser. No. 534,115
Claims priority, application Japan July 9, 1974
Term of patent 14 years
Int. Cl. D10—*01*
U.S. Cl. D56—4 B



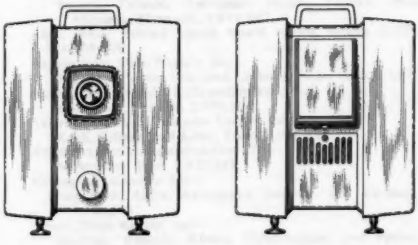
240,664
MICROFICHE CAMERA
Harry Arthur Hele Spence-Bate, Lot 115, Cheam Place, Morley, Western Australia, Australia
Filed Dec. 5, 1974, Ser. No. 529,851
Claims priority, application Great Britain June 14, 1974
Term of patent 14 years
Int. Cl. D16—*01*
U.S. Cl. D16—2



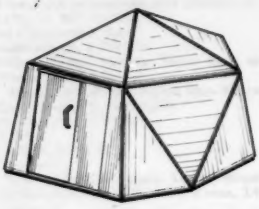
240,665
SOUND PROJECTOR
Jochen Kramer, Wolfsburg, Claus Prochnow, Braunschweig, and Reinhard Sobotta, Mascherode, Germany, assignors to Rollei-Werke Franke & Heidecke, Braunschweig, Germany
Filed Jan. 17, 1975, Ser. No. 541,930
Claims priority, application Germany July 25, 1974
Term of patent 14 years
Int. Cl. D16—*02*
U.S. Cl. D16—21



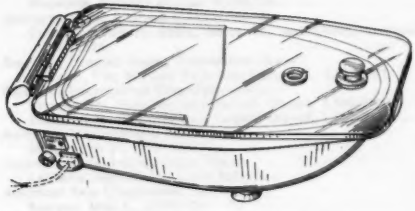
240,666
LARGE SCREEN TELEVISION PROJECTOR
Reynolds B. Winslow, 104 Concord Place, Syracuse, N.Y. 13210, and Richard E. Lee, 4665 Ridge Road, Cazenovia, N.Y. 13035
Filed Feb. 5, 1975, Ser. No. 547,267
Term of patent 14 years
Int. Cl. D16—*02*
U.S. Cl. D56—4 D



240,667
SAUNA
Joseph G. Hall, 102 Geary Ave., Kentfield, Calif. 94904
Filed May 6, 1974, Ser. No. 466,959
Term of patent 14 years
Int. Cl. D24—*99*; D25—*02*
U.S. Cl. D83—1 C



240,668
VACUUM DEVICE FOR ADDING A FLOWABLE MATERIAL TO AN EXPANDABLE MEDICAL CONTAINER
Herbert Fred D'Alo, Oakwood Hills-Cary, Ill., assignor to Abbott Laboratories, North Chicago, Ill.
Filed Mar. 6, 1975, Ser. No. 555,762
Term of patent 14 years
Int. Cl. D24—*04*
U.S. Cl. D83—1 F



240,669
BUTTONER
Clyde H. Pifer, R.R. 1, Box 379, Devine, Tex. 78016
Filed Oct. 24, 1974, Ser. No. 517,638
Term of patent 14 years
Int. Cl. D28—*99*
U.S. Cl. D86—10 A

LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 20TH DAY OF JULY, 1976

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. Christiaens Societe Anonyme: *See—*
Vanhoof, Pierre M., 3,970,650.

AB Carbox: *See—*
Jonsson, Finn L.; and Adolfsson, Rune G., 3,969,921.
Wiberg, Robert, 3,969,916.

AB Inventing: *See—*
Wallsten, Hans Ivar, 3,970,328.

Abbott Laboratories: *See—*
Freiberg, Leslie Alan, 3,970,642.
Wolownik, Stephen, 3,970,710.

Abe, Keiji: *See—*
Terajima, Kazuki; Tomita, Shigeru; Matsuda, Yoshindo; and Abe, Keiji, 3,970,553.

Abildskov, Dale P.: *See—*
Ashton, Larry J.; and Abildskov, Dale P., 3,970,495.

Acoustical Manufacturing Company Limited, The: *See—*
Walker, Peter James; and Albinson, Michael Peter, 3,970,953.

Ad-One, Inc.: *See—*
Alford, Lauritz Lauritzen, Jr., 3,970,332.

Adachi, Takayoshi: *See—*
Kishikawa, Hiroshi; Adachi, Takayoshi; and Usami, Tamio, 3,970,863.

Addressograph Multigraph Corporation: *See—*
Wu, Alexander Chiang-Hsia; and Hou, Shou Ling, 3,970,452.

Adkins, Larry R., to Rockwell International Corporation. Monolithic acoustoelectric image pick-up device. 3,970,778, Cl. 178-7.100.

Adolfsson, Rune G.: *See—*
Jonsson, Finn L.; and Adolfsson, Rune G., 3,969,921.

Aeschlimann, Hans-Peter, to Dr. Molter GmbH. Universal centrifuge. 3,970,245, Cl. 233-24.000.

Agence Nationale de Valorisation de la Recherche (ANVAR): *See—*
Julia, Marc, 3,970,706.

Aguet, Emile, to Sulzer Brothers Limited. Combined gas turbine and steam powder plant. 3,969,891, Cl. 60-39.18B.

Ahlstrand, Bengt Erik; and Carlsson, Rune Henry, to Aktiebolaget Stille-Werner. Separating and filtering device. 3,970,565, Cl. 210-359.000.

Aiba, Masahiko: *See—*
Takano, Rikuo; Sumitomo, Yuji; Yamamoto, Yoichi; Makita, Tomoo; and Aiba, Masahiko, 3,971,039.

Aichinger, Gerd; Haberkorn, Axel; Kolling, Heinrich; Kranz, Eckart; and Reisdorff, Josef, to Bayer Aktiengesellschaft. Coccidiocidal compositions utilizing 1-phenyl-substituted 1,3,5-triazine. 3,970,752, Cl. 424-249.000.

Ailshie, Roger Howard, to Cross Manufacturing, Inc. Priority hydraulic control valve. 3,970,108, Cl. 137-596.130.

Aisin Seiki Kabushiki Kaisha: *See—*
Miyao, Takayuki; Maeda, Hiroaki; Sato, Masanori; and Sakai, Toshimitsu, 3,969,958.

Aislantes Leon, S.A.: *See—*
Silveyra, Salvador, 3,970,279.

Ajinomoto Co., Inc.: *See—*
Tsuchida, Takayasu; Momose, Haruo; and Hirose, Yoshio, 3,970,519.

Akiyama, Masanori: *See—*
Suzuki, Takeshi; Takenaka, Shigeo; Tanaka, Hiroshi; and Akiyama, Masanori, 3,971,043.

Aksu, Akin. Printed circuit board testing means. 3,970,934, Cl. 324-158.00F.

Aktiebolaget Stille-Werner: *See—*
Ahlstrand, Bengt Erik; and Carlsson, Rune Henry, 3,970,565.

Aktiebolaget Svenska Kullagerfabriken: *See—*
Andersson, Per Ulf, 3,970,165.

Aktiengesellschaft Gebruder Loepfe: *See—*
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Aktieselskabet Grindstedvaerket: *See—*
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Albers, Ernst-August: *See—*
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Ginn, Martin E.; and Liebman, Irwin, 3,970,595.

Albinson, Michael Peter: *See—*
Walker, Peter James; and Albinson, Michael Peter, 3,970,953.

Alco Standard Corporation: *See—*
Niemeyer, Robert W., 3,970,337.

Alcock, Robert Nicholas; Vincent, Richard Paul; and Robinson, Stephen Joseph, to U.S. Philips Corporation. Radio interferometer sector-definition. 3,971,027, Cl. 343-113.00R.

Alderman, Robert J. Roof system. 3,969,863, Cl. 52-407.000.

Alford, Lauritz Lauritzen, Jr., to Ad-One, Inc. Airline ticket and information folder. 3,970,332, Cl. 281-31.000.

Allen, Edgar Robert, to Post Office, The. Measurement of noise in a communication channel. 3,970,795, Cl. 179-15.0BF.

Allen, W. Henry, to Kockum Industries, Inc. Log debarker. 3,970,126, Cl. 144-208.00E.

Allen, William W.; and Stopper, Herbert, to Burroughs Corporation. Voltage and temperature compensation circuitry for current mode logic. 3,970,876, Cl. 307-310.000.

Allied Chemical Corporation: *See—*
Lewis, Donald Joseph, 3,970,329.
Moore, William Percy; Sansing, James Earl; and Williamson, Harold Daniel, 3,970,625.
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Amano, Kitsutaro: *See—*
Kinuhata, Koji; Amano, Kitsutaro; Sasaki, Hiroshi; Yamamoto, Hideo; Shibata, Kosho; and Yamada, Kazuo, 3,970,776.

Amass, Peter: *See—*
Bradford, Robert S.; and Amass, Peter, 3,970,777.

Amberg, Stephen W.; and Doherty, Thomas E., to Owens-Illinois, Inc. Method and apparatus for forming thermoplastic containers. 3,970,492, Cl. 156-85.000.

American Bioculture, Inc.: *See—*
Fogel, Samuel; Foster, Patricia L.; Schenck, Paula; and Walker, William W., Jr., 3,969,844.

American Carrier Equipment: *See—*
Sweet, Philip J.; Hamlet, Buck C.; and Sweet, David L., 3,970,293.

American Cyanamid Company: *See—*
Bollyky, Laszlo Joseph, 3,970,660.
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Hardy, William Baptist; and Susi, Peter Vincent, 3,970,636.
Hardy, William Baptist; and Savides, Christos, 3,970,644.
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American Hospital Supply Corporation: *See—*
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American International Corporation: *See—*
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American Marine Industries, Inc.: *See—*
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American Optical Corporation: *See—*
Laliberte, Norman U., 3,970,362.

American Tara Corporation: *See—*
Kawano, Mak S., 3,970,039.

Amico, Peter. Expansion unit. 3,969,976, Cl. 85-75.000.

Amoroso, Michael J., to M.A.T. Industries, Inc. Torque limiting adaptor. 3,969,961, Cl. 81-52.40R.

AMP Incorporated: *See—*
Hopkins, John Root; Renn, Robert Maurice; and Southard, Robert Keith, 3,970,354.
Kaufman, John Wilson, 3,970,353.
Swengel, Robert Charles, Sr.; Lemke, Timothy Allen; and Villiard, Frederick Phillip, 3,969,816.

Amrol Corporation: *See—*
Sinnock, Pomeroy; Lauer, Joseph Robert; Manthei, David H.; and Rugg, Arthur C., 3,970,134.

Anaconda Wire & Cable Company: *See—*
Pendleton, Wesley William; and Thompson, Robert Clifton, 3,970,924.

Anahara, Meiji; Kawasaki, Yukio; and Suzuki, Yasuo, to Toyo Boseki KK. Method for manufacturing a textured yarn. 3,969,885, Cl. 57-157.00R.

Anaren Microwave, Incorporated: *See—*
Sly, Thomas L., 3,970,968.

Anbar, Michael; McMillen, Donald F.; Weaver, Robert D.; and Jorgensen, Paul J., to Stanford Research Institute. Method and apparatus for electrochemical generation of power from carbonaceous fuels. 3,970,474, Cl. 136-86.00A.

Anders Sahlin AB: *See—*
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Andersen, Finn, to Andersen, Finn; and Andersen, Keld. Ceiling structure. 3,969,865, Cl. 52-483.000.

Andersen, Keld: *See—*
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Anderson, Teddy Lee: *See—*
Findley, Gerald Ivan; and Anderson, Teddy Lee, 3,971,044.

Andersson, Per Ulf, to Aktiebolaget Svenska Kullagerfabriken. Power assisted steering system. 3,970,165, Cl. 180-155.000.

Ando, Meiki: *See—*
Kano, Saburo; Nomura, Osami; Asada, Mitsuo; Ando, Meiki; Matsuda, Michihiko; Yamada, Tomio; Watanabe, Hitoshi; and Taniguchi, Takuzo, 3,970,751.

Andoh, Akira, to Clemix Co. Apparatus for controlling noxious exhaust gases from internal-combustion engine. 3,970,052, Cl. 123-25.00R.

Andreas Stihl Maschinenfabrik: *See—*
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Andreescu, Millo: *See—*
Mogos, Ion; Ionescu, Cornel; Angelescu, Dionisie; Dumitrescu, Nicolae; Andreescu, Millo; Neascu, Constantin; Brozici, Mircea; Birzanescu, Mihai; Puie, Alexandru; and Vasilica, Gheorghe, 3,970,074.

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Applegate, Leslie T., Jr., to Surgical Appliance Industries, Inc. Tennis elbow brace. 3,970,081, Cl. 128-95.000.

Arai, Michio, to Sony Corporation. Analog memory circuit utilizing a field effect transistor for signal storage. 3,971,055, Cl. 357-22.000.

Arai, Toshiharu: *See—*
Yoshiura, Hirohisa; Arai, Toshiharu; Miyake, Masao; and Enriki, Kiyoshi, 3,970,632.

Araya, Kumakichi. Method of manufacturing stepped bushings for chains. 3,969,889, Cl. 59-8.000.

Armstrong, Terrance R. Business card system. 3,970,397, Cl. 402-79.000.

Arnesen, Arne Georg; and Schokkenbroek, Jan, to Elkem-Spigerverket A/S. Method for repairing ingot molds and apparatus therefor. 3,970,814, Cl. 219-76.000.

Arnold, Richard C., to United States of America, Energy Research and Development Administration. Telecommunication using muon beams. 3,970,936, Cl. 325-26.000.

Aro Manufacturing Co., Inc.: *See—*
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Aronberg, Lester, to Lake Chemical Company. Soldering of stainless steels. 3,970,238, Cl. 228-207.000.

Artcraft Wire Goods, Inc.: *See—*
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Ashida, Akira; Ishikawa, Kazuo; Takahashi, Kiyoshi; Komine, Yoshio; and Hosoe, Kazuya, to Canon Kabushiki Kaisha. Film handling system employing a common cartridge. 3,970,380, Cl. 352-130.000.

Ashton, Larry J.; and Abildskov, Dale P., to Fiber Science, Inc. Method of making a tubular shaft of helically wound filaments. 3,970,495, Cl. 156-162.000.

Askienazy, Alexandre; Melki, Georges; and Stevenin, Jean, to Compagnie Francaise de Produits Industriels. Method of chemical peeling of fruits and vegetables with an alkanolamine. 3,970,762, Cl. 426-287.000.

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Atlantic Richfield Company: *See—*
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Attridge, Russell G., Jr.; and Kulick, Andrew, to Ranco Incorporated. Air conditioning control system. 3,970,246, Cl. 236-44.00C.

Auer, John H.; and Smith, Willis R., to General Signal Corporation. Dual frequency track circuit. 3,970,271, Cl. 246-34.00R.

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Bachmann, William V. Internal combustion engine. 3,969,894, Cl. 60-307.000.

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Schutz, Hans Ulrich; Back, Gerhard; and Beffa, Fabio, 3,970,615.

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Bader, Henry; and Feingold, Michael H., to Polaroid Corporation. Synthesis of chrome-complexed dye developers in the presence of weakly basic anion exchange resins. 3,970,616, Cl. 260-147.000.

Baer, James A.; Clark, Charles B.; and Schaefer, Louis F., to Savin Business Machines Corporation. Toner concentration detector for dry powder magnetic brush toning system. 3,970,036, Cl. 118-7.000.

Bainter, Huston K.; and Nerem, Marvin E., to Winnebago Industries, Inc. Insulation structure. 3,969,868, Cl. 52-622.000.

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Heller, Laszlo; Forgo, Laszlo; and Bakay, Arpad, 3,970,140.

Baker, Philip G.; and Johnson, Bruce K., to Polaroid Corporation. Focusing screen. 3,971,051, Cl. 354-201.000.

Baker, W. Barry; Kochur, John Charles; and Stoneman, Estel McKinley, to Du Pont de Nemours, E. I., and Company. Apparatus for feeding fuel to an engine. 3,969,922, Cl. 73-35.000.

Bakerdrill, Inc.: *See—*
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Baldini, Giorgio; and Trentini, Gianpietro, to Beloit Corporation. Stretching device for filaments or strands. 3,969,800, Cl. 28-71.300.

Bale, Robert William, Jr. Rack and bicycle locking unit. 3,970,197, Cl. 211-5.000.

Ball Brothers Research Corporation: *See—*
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Ball, Edward: *See—*
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Ball, Kenneth D.: *See—*
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Ballard, Hyde W. Method and apparatus for sealing an electrical receptacle. 3,970,772, Cl. 174-53.000.

Balzer, Hans; Fleck, Fritz; and Schmid, Hans-Rudolf, to Sandoz Ltd. Bis-(triazinylamino)stilbene compounds. 3,970,647, Cl. 260-240.00B.

Balzers Patent und Beteiligungs AG: *See—*
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Banfi, Antonio, to Societa Italiana Elettronica S.p.A. Bistable logic circuit with in-service test capability. 3,970,873, Cl. 307-276.000.

Banister Pipelines, Ltd.: *See—*
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Bankes, Robert B.; and Gladney, Walter W., to Western Electric Co., Inc. Methods and apparatus for treating wafer-like articles. 3,970,471, Cl. 134-6.000.

Banks, Jon F.; Livesay, Eugene F.; and Martin, Reynold W., to Brown & Williamson Tobacco Corporation. Cryogenic threshing of tobacco. 3,970,091, Cl. 131-122.000.

Banys, Algis R., to Sperry Rand Corporation. Gravity stabilized internesting carrier system for mechanized filing and storage cabinets. 3,970,349, Cl. 312-268.000.

Bargain, Michel, to Rhone-Poulenc S.A. Heat-stable polyimide resin modified by unsaturated polyester. 3,970,714, Cl. 260-857.0PE.

Barkel, Barry M.; Collins, Stephen M.; and Herring, William M., to BASF Wyandotte Corporation. Multiple filter press diaphragm former. 3,970,516, Cl. 162-382.000.

Barrett, Fred O.: *See—*
Sturwold, Robert J.; and Barrett, Fred O., 3,970,569.

Barrett, John H., Jr., to Purex Corporation. Liquid peroxygen bleach. 3,970,575, Cl. 252-95.000.

Barringer, Anthony Rene, to Barringer Research Limited. Method and apparatus for collecting atmospheric samples in atmospheric geochemical prospecting. 3,970,428, Cl. 23-230.0EP.

Barringer Research Limited: *See—*
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Barrington, Burchus Q.; Farley, David L.; and Morrisett, O. L., to Halliburton Company. Method and apparatus for testing wells. 3,969,937, Cl. 73-151.000.

Bartels, Fred Willie, to Banister Pipelines, Ltd. Tool power system usable as substitute for vehicle propulsion. 3,970,154, Cl. 173-24.000.

Barth, Jordan B., to Colgate-Palmolive Company. Humectant sweetener. 3,970,747, Cl. 424-52.000.

Bartley, Bryan Allen: *See—*
MacDonald, George James; and Bartley, Bryan Allen, 3,970,257.

Barto, Robert W.; and Brown, Leonard A. Refrigerator water reservoir assembly for the automatic ice maker and the ice water dispenser. 3,969,909, Cl. 62-179.000.

BASF Aktiengesellschaft: *See—*
Falkenstein, Georg; Palm, Richard; and Wolff, Dietrich, 3,970,600.
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BASF Wyandotte Corporation: *See—*
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Bassinger Tool Enterprises, Ltd.: *See—*
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Bastian, Elmer, to Oak Industries Inc. Trimmer for a tuned UHF line. 3,970,974, Cl. 334-45.000.

Bates, Wayne J.; Berenson, Walter L.; Euchner, William H., Jr.; Grigg, James H.; Stern, Morton; and Taylor, Ronald W., to Motorola, Inc. Modem for a suppressed carrier communications system. 3,970,937, Cl. 325-49.000.

Batorewicz, Wadim, to Uniroyal, Inc. Polycyclic phosphate esters and process for preparing same. 3,970,726, Cl. 260-927.00R.

Battelle Memorial Institute: *See—*
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Baudouin, Daniel Adrian; and Dumas, John R., to Texas Instruments Incorporated. Slaving calculator chips. 3,970,995, Cl. 340-172.500.

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Baugh, Clarence L. Interferon production. 3,970,749, Cl. 424-85.000.

Baumann, Arthur V. Oxygen tank holder for wheelchairs. 3,970,344, Cl. 297-189.000.

Baumann, Eduard; and Waldispuhl, Candidus A., to Zellweger Uster AG. Method of automatically isolating a faulty section of a power line belonging to an electrical energy supply network, and arrangement for carrying out this method. 3,970,898, Cl. 317-25.000.

Baumann, Hans, to Grob & Co. Aktiengesellschaft. Heald frame with movable holding element fitted on the frame stave. 3,970,114, Cl. 139-91.000.

Baus, Richard E.: *See—*
Miller, John J.; Baus, Richard E.; and Lewis, Sheldon N., 3,970,633.

Baxter, Alan Raymond. Collapsible container. 3,970,209, Cl. 220-6.000.

Baxter, Donald J., to Marquette Metal Products Company. Support for an actuating arm of a control element of a spring clutch. 3,970,175, Cl. 192-22.000.

Bayer Aktiengesellschaft: *See—*
Aichinger, Gerd; Haberkorn, Axel; Kolling, Heinrich; Kranz, Eckart; and Reisdorff, Josef, 3,970,752.
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Lorenz, Walter; Boshagen, Horst; Hammann, Ingeborg; and Behrenz, Wolfgang, 3,970,665.
Muller-Albrecht, Horst; Quiring, Bernd; Dollhausen, Manfred; and Wulff, Jochen, 3,970,717.
Scharfe, Gerhard; Schwerdtel, Wulf; Swodenk, Wolfgang; Engelhard, Bruno; Grolig, Johann; Martin, Manfred; and Reissinger, Karl-Hermann, 3,970,713.
Schliebs, Reinhard; Wechsberg, Manfred; and Meussdoerffer, Johann Nikolaus, 3,970,586.
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Bayer, Bryce E., to Eastman Kodak Company. Color imaging array. 3,971,065, Cl. 358-41.000.

Baylis, Anthony B., to Celanese Corporation. Preparation of pyridine. 3,970,655, Cl. 260-290.00P.

Bayne, Robert Paton: *See—*
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Bazin, Lucas John; and Peterson, Gary Ray, to RCA Corporation. Electronic signal mixer. 3,970,774, Cl. 178-6.000.

BBA Group Limited: *See—*
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Beatrice Foods Company: *See—*
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Beaver, John R. Adjusting tool for surgical blade guard. 3,969,959, Cl. 81-3.00R.

Beavon, David K., to Ralph M. Parsons Company. Process for the production of sulfur from mixtures of hydrogen sulfide and fixed nitrogen compounds. 3,970,743, Cl. 423-574.00R.

Beck, Emory J., to Martin Marietta Corporation. Method of manufacturing an overwrapped pressure vessel. 3,969,812, Cl. 29-421.00R.

Beck, Kurt-Gunther; Rohde, Wolfgang; Echterhoff, Heinrich; and Nashan, Gerd, to Bergwerksverband GmbH. Processes of producing cokes of large lump size and improved strength from bituminous coals. 3,970,523, Cl. 201-1.000.

Becker, Klaus: *See—*
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Beeler, David R.: *See—*
Copeland, Robert L.; Greene, Ralph F.; Beeler, David R.; Eastridge, Robert A.; and Chase, Vance A., 3,970,006.

Beery, Jack; and Wisner, Daniel A., to Burroughs Corporation. Wide-range digital reluctance tachometer. 3,970,935, Cl. 324-166.000.

Beffa, Fabio: *See—*
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Behrenz, Wolfgang: *See—*
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Bell, Allan D., Jr.; Ford, Wilson H.; and McQuiston, Charles R., to Dektor Counterintelligence and Security, Inc. Physiological response analysis method and apparatus. 3,971,034, Cl. 346-1.000.

Bell, Gordon M.: *See—*
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Minetti, Richard Henry; and Strickland, Robert Walter, 3,969,813.
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Beller, Sidney J. Overflow-siphoning device for swimming pools and the like. 3,969,777, Cl. 4-172.170.

Belli, Frank G.; and Augostini, Peter P., to Xerox Corporation. Imaging by selective stripping out areas of layer. 3,970,453, Cl. 96-1.400.

Bellofram Corporation: *See—*
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Beloit Corporation: *See—*
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Moore, Lawrence A., 3,970,421.
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Bender, Martin; Knappstein, Johannes; and Stratmann, Josef, to Hartung, Kuhn & Co. GmbH, Firma; Carl Still, Firma; and Hartung, Kuhn & Co. GmbH, Firma. Closed tank coke car construction. 3,970,526, Cl. 202-227.000.

Bendix Corporation, The: *See—*
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Harris, Robert C., 3,970,591.

Benedetti, Angelo W. Method of reconstructing asphalt pavement. 3,970,404, Cl. 404-77.000.

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Benham, Edward Edmund; Menn, Walter A.; Spranger, Douglas M.; and Brookes, Malcolm J., to International Telephone and Telegraph Corporation. Adjustable mounting structure for video telephone unit. 3,970,792, Cl. 179-2.0TV.

Bennett, Richard H.: *See—*
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Bentley, Richard Paul. Thermal efficiency structure. 3,969,860, Cl. 52-261.000.

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Berger, Emil J., Jr.; and Mitchard, John M., to Union Camp Corporation. Sheet registry device. 3,970,299, Cl. 271-250.000.

Berglund, Carl O., to Teledyne Exploration Company. Piezoelectric transducer unit and hydrophone assembly. 3,970,878, Cl. 310-8.600.

Bergwerksverband GmbH: *See—*
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Berisfords Limited: *See—*
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Bernard, James A., to General Motors Corporation. Control valve. 3,970,112, Cl. 137-807.000.

Bernotus, Donald E.; and Levitt, Leo L., to Verson Allsteel Press Company. Method and apparatus for blanking coil stock for transfer presses. 3,969,918, Cl. 72-337.000.

Bernstein, Alvin H.; and Santulli, Domenic J. Button and retainer. 3,969,791, Cl. 24-56.000.

Beta Corporation of St. Louis: *See—*
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Bhaumik, Mani L.: *See—*
Olson, N. Thomas; Ault, Earl R.; and Bhaumik, Mani L., 3,970,964.

Bianchi, Nereo, to Necchi S.p.A. Sewing threads trimming device for sewing machines. 3,970,020, Cl. 112-252.000.

Bibaut, Gilbert Abel. Earth moving machinery made amphibious. 3,970,029, Cl. 115-1.00R.

Bice, James William: *See*—
Kurtz, Anthony D.; Mallon, Joseph R.; Brosh, Amnon; and Bice, James William, 3,970,982.

Bio-Medicus, Inc.: *See*—
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Birckhead, Lennox, Jr., to Vitek Research Corporation. Powder deposition system. 3,970,035, Cl. 118-7.000.

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Mogos, Ion; Ionescu, Cornel; Angelescu, Dionisie; Dumitrescu, Nicolae; Andreescu, Millo; Neascu, Constantin; Brozici, Mircea; Birzanescu, Mihai; Puie, Alexandru; and Vasilica, Gheorghe, 3,970,074.

Bissonette, Vernon Leon, to Eastman Kodak Company. Imagewise hardening with inert transition metal complex oxidizing agents. 3,970,458, Cl. 96-55.000.

Black, Bill Adby; and Eenink, Johannes Gerardus Leon, to Hughes Tool Company. Tooth loading for earth boring bits. 3,970,158, Cl. 175-410.000.

Black Clawson Company, The: *See*—
Seifert, Peter; and Chupka, David E., 3,970,548.

Black Clawson Fibreclaim, Inc.: *See*—
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Black, James A.: *See*—
Porth, Frank L., 3,970,040.

Blackwood, Everett E. Technique for strengthening steering column shift sockets. 3,969,951, Cl. 74-473.0SW.

Blau, Henry H., Jr.; and Kebabian, Paul L., to Environmental Research & Technology, Inc. Light equalizer. 3,970,375, Cl. 350-312.000.

Blood, Alden E.: *See*—
Snapp, Thomas C., Jr.; Blood, Alden E.; and Johnson, Sam H., Jr., 3,970,619.

Blowsky, Frank C., to Luis Mestre Development Corporation. Sheet withdrawing mechanism and its combination with a collator. 3,970,297, Cl. 270-58.000.

Blum Gesellschaft m.b.H.: *See*—
Rock, Erich; and Mages, Bernhard, 3,969,787.

Blust, Henry Leo; Lindburg, Norman Lee; and Henry, Dale Vernon, to RCA Corporation. Method of anchoring metallic coated leads to ceramic bodies and lead-ceramic bodies formed thereby. 3,970,235, Cl. 228-122.000.

BOC Limited: *See*—
Regan, Albert John, 3,970,957.

Bock, Erich: *See*—
Deisinger, Franz; Husges, Gert; Bock, Erich; Niestroj, Heinrich; and Henzgen, Detlef, 3,969,910.

Bock, Heinrich: *See*—
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Bode, Wolfgang W.; Fein, Michael E.; and Hinson, David C., to Owens-Illinois, Inc. Multiple gas discharge device having improved photon conditioning. 3,970,886, Cl. 313-223.000.

Boggs, George L. Veterinary surgical method. 3,970,046, Cl. 119-103.000.

Bohler, Hans; and Griesser, Rolf, to Sandoz Ltd. Bisazomethine metal complexes. 3,970,649, Cl. 260-240.00G.

Bohm, Richard: *See*—
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Bohrdt, Joaquin: *See*—
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Boisrayon, Gerald Marc Albert; Martin, Gilbert Marius Henri; and Fagnen, Edmond G., to Etat Francais. Underwater escape apparatus. 3,969,903, Cl. 61-70.000.

Boldrini, Luigi. Machines for the production of chenille yarns and spooling thereof. 3,969,881, Cl. 57-24.000.

Bolduc, Paul E., to United States of America, Energy Research and Development Administration. Cylindrical electron beam diode. 3,970,956, Cl. 331-94.5PE.

Bollyky, Laszlo Joseph, to American Cyanamid Company. Chemiluminescence. 3,970,660, Cl. 260-295.00L.

Bommes, Willi, to Jagenberg Werke AG. Method for the application of glued labels to bottles or the like. 3,970,499, Cl. 156-227.000.

Bongert, Wilhelm, to Klockner-Humboldt-Deutz Aktiengesellschaft. Method and means for separation of liquids from a mixture of solids and liquids. 3,970,552, Cl. 210-19.000.

Bongertman, Pieter Jan Willem, to Cindu N.V. Method of preparing electrode pitches. 3,970,542, Cl. 208-22.000.

Boothroyd, William A.; and Sorensen, Boyd W., to International Business Machines Corporation. Transaction terminal with unlimited range of functions. 3,970,992, Cl. 340-172.500.

Borchert, Marshall Bond, to Tektronix, Inc. Multiple-line display signal generating apparatus having a single line position control. 3,971,011, Cl. 340-324.00A.

Borg-Warner Corporation: *See*—
Dockus, Kostas F., 3,970,237.
Hechenbleikner, Ingenuin; and Enlow, William Palmer, 3,970,532.
Wiese, Winfred J., 3,970,320.

Borkovitz, Henry S.; and Peterson, Wesley G., to Sola Basic Industries, Inc. Line isolation monitor. 3,971,007, Cl. 340-255.000.

Boroffka, Hartmut; Krimmel, Eberhard; and Runge, Hartmut, to Siemens Aktiengesellschaft. High speed ion beam switching arrangement for use in the production of determinate solid body dopings by means of ion implantation. 3,970,854, Cl. 250-492.00A.

Borsuk, Alvin; and Johnson, Charles H., to Oscar Mayer & Co. Inc. Walking beam conveyer. 3,970,008, Cl. 104-162.000.

Borucki, Eugene W.; and Zaloga, Peter P. Test apparatus for use with a heating system. 3,970,929, Cl. 324-73.00R.

Boshagen, Horst: *See*—
Lorenz, Walter; Boshagen, Horst; Hammann, Ingeborg; and Behrenz, Wolfgang, 3,970,665.

Boswank, Stuart E.; Jones, Robert H.; and Whaley, Newton P., to Southwest Wheel and Manufacturing Company. Tank vent. 3,970,098, Cl. 137-39.000.

Bouton, Thomas C.; and Futamura, Shingo, to Firestone Tire & Rubber Company, The. Controlled high temperature polymerization of butadiene. 3,970,607, Cl. 526-335.000.

Bouvet, Jean. Mill roll. 3,969,802, Cl. 29-121.00R.

Bouyoucos, John V., to Hydroacoustics Inc. Hydroacoustic apparatus and valving mechanisms for use therein. 3,969,984, Cl. 91-276.000.

Bovier, Edward M.: *See*—
Voight, John E.; Bovier, Edward M.; and Liebman, Clarence J., 3,970,467.

Bower, Allen M., to Emco Ltd. Roll over valve for tank truck. 3,970,107, Cl. 137-587.000.

Bowers, William S., to United States of America, Agriculture. Synthetic hormones for insect control. 3,970,688, Cl. 260-484.00R.

Boyd, Gerald K., to Production Service & Equipment Incorporated. Standing valve assembly. 3,970,145, Cl. 166-188.000.

Boyd, Robert Lee. Hazardous leakage current preventing for refractory-encased heater elements. 3,970,817, Cl. 219-209.000.

Boykin, Robert O., Jr. Subsurface shutoff valve and control means. 3,970,144, Cl. 166-53.000.

BP Chemicals International Limited: *See*—
Goldie, Brian Peter Forsyth; Kirkwood, Kenneth Clark; and Lightbody, Alan William, 3,970,613.

Bradford, Robert S.; and Amass, Peter, to Minnesota Mining and Manufacturing Company. Apparatus for adjusting video pedestal and peak white level. 3,970,777, Cl. 178-7.100.

Brady, William J. Paint applicator. 3,970,396, Cl. 401-208.000.

Brandstatter, Hubertus; and Tscholl, Oswald, to American International Corporation. Machine gun. 3,969,980, Cl. 89-33.00D.

Brandstatter, Hubertus; and Tscholl, Oswald, to American International Corporation. Machine gun cartridge magazine. 3,969,981, Cl. 89-33.00D.

Brandt, Michael W. Liquid injector. 3,970,121, Cl. 141-2.000.

Branton, Tom Wendell, to RCA Corporation. Method for preparing a viewing-screen structure for a CRT having temperature-compensated mask-mounting means, including cooling mask during exposure. 3,970,456, Cl. 96-36.100.

Braun, Franz, to Gema AG Apparatebau. Measuring arrangement for an apparatus for electrostatic coating of grounded objects for measuring the ground resistence. 3,970,920, Cl. 324-32.000.

Braun, Robert A., to Du Pont de Nemours, E. I., and Company. Polyesters with substituted amine end groups. 3,970,687, Cl. 260-482.00C.

Braunbeck, Werner, to Siemens Aktiengesellschaft. Switching arrangement for ascertaining overlap prior to transfer of code digits in a telephone exchange. 3,970,800, Cl. 179-18.0AD.

Braunschweigische Maschinenbauanstalt: *See*—
Hentschel, Volkmar, 3,970,243.
Matusch, Siegfried, 3,970,469.

Bray Oil Company: *See*—
Pratt, Robert Eugene; and Habzansky, John, 3,970,570.

Breaux, Onezime P.; and Medicus, Gustav K., to United States of America, Air Force. Thermionic cathode transverse-discharge gas laser tube. 3,970,961, Cl. 331-94.5PE.

Breglia, John E. Target, projectile and centrifugal projector. 3,970,307, Cl. 273-95.00R.

Brett, Oliver C., Jr.: *See*—
Babson, Edward S.; Brett, Oliver C., Jr.; Cavicchi, Warren A.; and Lutts, Carlton G., 3,970,017.

Brettman, William M.; and White, David L., to Motorola, Inc. Housing arrangement for miniaturized electronic devices. 3,970,902, Cl. 317-120.000.

Bricot, Claude; and Lehureau, Jean Claude, to Thomson-Brandt. Device for the optical read-out of a diffractive track belonging to a data carrier in the form of a disc or tape. 3,971,002, Cl. 340-173.0LT.

Bridgestone Tire Company Limited: *See*—
Furukawa, Junji; Kobayashi, Eiichi; and Kawagoe, Takahiro, 3,970,608.

Briggs & Stratton Corporation: *See*—
Heindl, Kenneth J., 3,970,913.

Bristol-Myers Company: *See*—
Kaplan, Murray Arthur; and Granatek, Alphonse Peter, 3,970,651.

Brock, Thomas W.: *See*—
Planchock, Jerry L.; Stewart, Daniel R.; and Brock, Thomas W., 3,970,463.

Brockemeyer, Eugene W.; and Rodell, Michael B., to Sandoz, Inc. Effervescent potassium chloride composition. 3,970,750, Cl. 424-153.000.

Brockington, James W.; and Bennett, Richard H., to Texaco Inc. Alkylation process for production of motor fuels utilizing sulfuric acid catalyst with trifluoromethane sulfonic acid. 3,970,721, Cl. 260-683.630.

Brody, Frederick; and Pohl, Stanley, to Clairol Incorporated. Oxidative hair dye compositions. 3,970,423, Cl. 8-10.200.

Brongersma, Hidde Herman; and Walinga, Jacob, to U.S. Philips Corporation. Device for mass analysis and structure analysis of a surface layer by means of ion scattering. 3,970,849, Cl. 250-281.000.

Bronswerk Apparatenbouw B.V.: *See—*
Van Diepenbroek, Alfred Erich Wibrandt; Wormgoor, Jan Hendrik; and Schilperoort, Cornelis, 3,970,437.

Brookes, Malcolm J.: *See—*
Benham, Edward Edmund; Menn, Walter A.; Spranger, Douglas M.; and Brookes, Malcolm J., 3,970,792.

Brooks, Frank. Metering device and mixing apparatus. 3,970,288, Cl. 259-7.000.

Brooks, Joseph J.: *See—*
Sievers, Robert E.; and Brooks, Joseph J., 3,970,561.

Brooks & Perkins, Incorporated: *See—*
Mollon, Leslie; and Kline, John E., 3,970,001.

Brosh, Amnon: *See—*
Kurtz, Anthony D.; Mallon, Joseph R.; Brosh, Amnon; and Bice, James William, 3,970,982.

Brotz, Walter; Engelmann, Manfred; and Rieger, Klaus, to Hoechst Aktiengesellschaft. Coating composition. 3,970,624, Cl. 260-28.50A.

Brotzmann, Karl; Fassbinder, Hans Georg; Hofer, Friedrich Karl; and Mantey, Paul-Gerhard, to Eisenwerk-Gesellschaft Maximiliansnutte mbH. Method for pouring steel during continuous casting. 3,970,444, Cl. 75-46.000.

Broux, Roland, to S.T. Dupont. Method of forming a calibrated aperture in a molded article. 3,970,734, Cl. 264-219.000.

Brown, Henry, to Oxy Metal Industries Corporation. Electroformation of the running track of a rotary internal combustion engine. 3,970,527, Cl. 204-9.000.

Brown, Leonard A.: *See—*
Barto, Robert W.; and Brown, Leonard A., 3,969,909.

Brown, Omar L., to Fraze, Ermal C. Easy opening ecology end with retained tear strips. 3,970,212, Cl. 220-269.000.

Brown, Ralph A.; and Snow, Wilford W., to Sperry Rand Corporation. Quick-release hub. 3,970,262, Cl. 242-68.300.

Brown & Williamson Tobacco Corporation: *See—*
Banks, Jon F.; Livesay, Eugene F.; and Martin, Reynold W., 3,970,091.

Brozici, Mircea: *See—*
Mogos, Ion; Ionescu, Cornel; Angelescu, Dionisie; Dumitrescu, Nicolae; Andreescu, Millo; Neascu, Constantin; Brozici, Mircea; Birzanescu, Mihai; Puie, Alexandru; and Vasilica, Gheorghe, 3,970,074.

Bruderer, Werner: *See—*
Schmid, Markus; and Bruderer, Werner, 3,970,135.

Bruggisser, Klaus; Graf, Felix; Mandl, Gerhard; and Ruegg, Albert, to Rieter Machine Works, Ltd. Apparatus for building a rotationally symmetrically evened bobbin package and method of operating the apparatus. 3,970,260, Cl. 242-18.0DD.

Brune, Gerhard; Staib, Helmut; Kochendorfer, Heinrich; Hans, Waldemar; Ropstorff, Walter; Leiber, Heinz; and Kirstein, Lothar, to Robert Bosch G.m.b.H. Electromagnetic 3-way valve arrangement. 3,970,111, Cl. 137-627.500.

Bruno, Salvatore A., to Du Pont de Nemours, E. I., and Company. Navy-blue nitrophenylazonaphthylamino dyes. 3,970,617, Cl. 260-152.000.

Bryant, Doyle D., to Strand Century Incorporated. Apparatus for controlling the intensity of lights. 3,970,893, Cl. 315-293.000.

Bryant, James T.: *See—*
Schneider, Abraham; Wood, Stanley E.; and Bryant, James T., 3,969,979.

Bryant, Robert L. Music activated chromatic roulette generator. 3,969,972, Cl. 84-464.000.

Bucher, Albert, to Escher Wyss Limited. Clearing centrifuge. 3,970,244, Cl. 233-22.000.

Buchta, Siegfried: *See—*
Mayr, Theodor; Buchta, Siegfried; Kleeberger, Rudolf; and Bauer, Otto, 3,970,063.

Bucksch, Manfred, to Zahnradfabrik Friedrichshafen Aktiengesellschaft. Speed-changing system with two fluid-actuated clutches. 3,970,176, Cl. 192-87.110.

Buckson, Gerald Irving, to Du Pont de Nemours, E. I., and Company. Apparatus for web defect detection including a web swatch that contains a defect. 3,970,857, Cl. 250-563.000.

Buhler AG: *See—*
Ruegger, Edgar; and Meister, Stefan, 3,970,256.

Buhrer, Carl F., to GTE Laboratories Incorporated. Dual access magnetic domain memory. 3,971,005, Cl. 340-174.0TF.

Buhrer, Erwin. Pattern device including an upper trough pattern for the manufacture of the upper part of a foundry mold. 3,970,138, Cl. 164-244.000.

Builders Brass Works: *See—*
Peak, Ben, 3,969,786.

Bulten-Kanthal Aktiebolag: *See—*
Lejdegard, Sixten H., 3,969,974.

Bunker Ramo Corporation: *See—*
Dorrell, Robert Francis; and Janatka, Joseph, 3,970,352.
Kwan, Okum; and Ottersen, William A., 3,970,506.
McCaughey, William S., 3,969,806.
Nijman, John Peter, 3,970,802.

Bunner, Charles Brian David, to Northern Electric Company Limited. Shock resistant, temperature compensated helical resonator. 3,970,972, Cl. 333-82.0BT.

Burke, Emmett F. Loaded quad antenna. 3,971,031, Cl. 343-744.000.

Burke, George K.: *See—*
Raines, Kenneth; and Burke, George K., 3,970,084.
Raines, Kenneth; and Burke, George K., 3,970,490.

Burkes, William M.; and Miller, William H., to Rockwell International Corporation. Flow area modulator and flow deflector. 3,970,253, Cl. 239-265.190.

Burkley, Thomas E.: *See—*
Kraft, Louis Seelbach; and Burkley, Thomas E., 3,970,733.

Burnham, Robert D.: *See—*
Streifer, William; Scifres, Donald R.; and Burnham, Robert D., 3,970,958.

Burr-Ban Tool Service Company: *See—*
Kubicek, Louis A., 3,970,406.

Burron Medical Products, Inc.: *See—*
Raines, Kenneth; and Burke, George K., 3,970,084.
Raines, Kenneth; and Burke, George K., 3,970,490.

Burroughs Corporation: *See—*
Allen, William W.; and Stopper, Herbert, 3,970,876.
Beery, Jack; and Wisner, Daniel A., 3,970,935.

Burroway, Gary L.: *See—*
Feeney, George W.; and Burroway, Gary L., 3,970,623.

Burton, Grady, to MacGregor-Comarain, Inc. Portable tween deck. 3,970,026, Cl. 114-85.000.

Buscher, Harold T.: *See—*
Munson, Robert E.; and Buscher, Harold T., 3,971,032.

Busker, Leroy H., to Beloit Corporation. Controlled sequence pressure nip. 3,970,515, Cl. 162-360.00R.

Butcher, Alan George, to Dresser Europe, S.A. Fluid flow meter. 3,969,940, Cl. 73-253.000.

Butcher, Daryl T., to United States of America, Air Force. Regulating digital power supply. 3,970,919, Cl. 323-19.000.

Butler Manufacturing Company: *See—*
Stephenson, Fred J.; and Rush, Donald J., 3,969,864.

C.A.V. Limited: *See—*
Mowbray, Dorian Farrar, 3,970,414.

C.G.E.E.-Alsthom: *See—*
Debaigt, Jean, 3,970,276.

C.M.T. Co.: *See—*
Campbell, Theodore A., 3,969,962.

Calderazzo, Franklin J., to Pitney-Bowes, Inc. Method of fastening sheet material. 3,969,992, Cl. 93-1.100.

Caldwell, Roland B., to Ranco Incorporated. Control system for exhaust gas recirculating valve. 3,970,061, Cl. 123-119.00A.

Caldwell, Thurman T.: *See—*
Swafford, Clifton S.; Caldwell, Thurman T.; and Dungan, William J., 3,970,242.

Calspan Corporation: *See—*
Schott, John R.; and Gallagher, Timothy W., 3,970,848.

Cambardella, Mario: *See—*
Ebstein, John W.; and Cambardella, Mario, 3,970,304.

Campagna, Benjamin J.; and Campagna, Samuel A., Jr., to Campagna, Benjamin J. Combination manhole closure assembly and separate support ring. 3,969,847, Cl. 52-1.000.

Campagna, Samuel A., Jr.: *See—*
Campagna, Benjamin J.; and Campagna, Samuel A., Jr., 3,969,847.

Campbell, Max L., to Hydro-Flex Corporation, Inc. Connectors for coupling meters with meter bars. 3,970,334, Cl. 285-30.000.

Campbell, Theodore A., to C.M.T. Co. Friction drive wrench. 3,969,962, Cl. 81-60.000.

Canadian Industries, Ltd.: *See—*
Connelly, William; Khan, Hamid Iqbal; and McEwan, Ian Hugh, 3,970,628.

Canadian Patents and Development Limited: *See—*
Tanney, John W., 3,969,938.

Canevari, Roger: *See—*
Regnier, Gilbert; Canevari, Roger; and Pascaud, Xavier, 3,970,661.
Regnier, Gilbert; Canevari, Roger; and Pascaud, Xavier, 3,970,663.

Cann, Alfred J., to Sanders Associates, Inc. Coherent frequency memory. 3,971,021, Cl. 343-18.00E.

Cannell, John Corjeag; Leaper, Rodney Seymour; and Parratt, Noel James, to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the. Method of manufacturing composite materials. 3,970,136, Cl. 164-108.000.

Cannon, Frances G. H.: *See—*
Cannon, Thomas; Cannon, Frances G. H.; Cowan, Jane E. H.; and McCarthy, Bernard, 3,970,559.

Cannon, Thomas; Cannon, Frances G. H.; Cowan, Jane E. H.; and McCarthy, Bernard. Drain guard. 3,970,559, Cl. 210-166.000.

Canon Kabushiki Kaisha: *See—*
Ashida, Akira; Ishikawa, Kazuo; Takahashi, Kiyoshi; Komine, Yoshio; and Hosoe, Kazuya, 3,970,380.
Isobe, Yasuo; Ito, Tadashi; and Ito, Fumio, 3,971,047.
Ito, Tadashi; Nakamoto, Soichi; and Okuno, Youichi, 3,971,048.
Sekiguchi, Takeshi, 3,970,366.
Tsuji, Sadahiko, 3,970,367.
Yamamoto, Eisuke; Sugiura, Susumu; and Sawamura, Osamu, 3,970,384.

Cantley, Ross H. Safe deposit box system. 3,970,010, Cl. 109-56.000.

Carabateas, Philip M.; and Williams, Gordon L., to Sterling Drug Inc. 4-(3-Nitrophenyl)-2,3,5,6-pyridinetetracarboxylic acid and intermediates. 3,970,662, Cl. 260-295.50R.

Carborundum Company, The: *See—*
Foster, Harry C., 3,970,255.
Cargo Graphics Corporation: *See—*
Maxwell, William H., 3,971,035.
Carl Still, Firma: *See—*
Bender, Martin; Knappstein, Johannes; and Stratmann, Josef, 3,970,526.
Carlsson, Rune Henry: *See—*
Ahlstrand, Bengt Erik; and Carlsson, Rune Henry, 3,970,565.
Carmello, Robert; Salka, Barry A.; and Corey, Garland G., to American Home Products Corporation. Bacteriostatic toilet bowl cleaner compositions. 3,970,576, Cl. 252-106.000.
Carpco, Inc.: *See—*
Webb, Clyde B.; and Knoll, Frank S., 3,970,546.
Carrigan, Gordon R. Ankle support. 3,970,083, Cl. 128-166.000.
Carroll, Charles D.; and Meginnis, George B., to General Motors Corporation. Seal structure. 3,970,319, Cl. 277-53.000.
Carroll, James J.; and Mitchell, Graham R., to General Electric Company. Electric circuit breaker comprising parallel-connected vacuum interrupters. 3,970,810, Cl. 200-144.00B.
Carson, John C., to Grumman Aerospace Corporation. Adaptive imaging system. 3,970,990, Cl. 340-146.30F.
Casebier, Ronald Leroy: *See—*
Sears, Karl David; and Casebier, Ronald Leroy, 3,970,691.
Casey, Everett Randolph. Ticket holder. 3,970,130, Cl. 150-39.000.
Cashin Systems Corporation: *See—*
Dillon, Oscar W., 3,969,966.
Castaneda, Rosa Maria, to Colgate-Palmolive Company. Hygienic napkin. 3,970,087, Cl. 128-290.00H.
Caterpillar Tractor Co.: *See—*
Codo, Edward A., 3,970,563.
Dezelan, Joseph E., 3,970,327.
Gale, Preston L.; Helton, Eugene L.; and Mueller, Robert C., 3,970,445.
Grawey, Charles E., 3,970,493.
Humphreys, Rex T.; Medina, Glenn J.; and Parker, Patrick A., 3,969,897.
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Shoup, Stephen G., 3,970,557.
Cavicchi, Warren A.: *See—*
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Cavitron Corporation: *See—*
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CBS Inc.: *See—*
Kinzie, George R., Jr.; and Gravereaux, Daniel, 3,970,803.
Celanese Corporation: *See—*
Baylis, Anthony B., 3,970,655.
Centronics Data Computer Corporation: *See—*
Robinson, Prentice; and Ramsden, Paul S., Jr., 3,970,183.
Cerfon, Pierre, to Compagnie Industrielle des Piles Electriques "Cipel". Electrochemical cell containing corrosion inhibitor. 3,970,476, Cl. 136-103.000.
Ceskoslovenska akademie ved: *See—*
Lochman, Lubomir; Rodova, Miroslava; and Trekoval, Jiri, 3,970,609.
CHA Industries: *See—*
Mahl, Gunard O. B., 3,970,820.
Chall, Steven Barry: *See—*
Pitchon, Esra; Chall, Steven Barry; and Schulman, Marvin, 3,970,765.
Challoner, Francis Loyola; and Varadarajan, Hemmige Desikachar, to International Business Machines Corporation. Touch keyboard. 3,971,013, Cl. 340-337.000.
Chambu, Claude: *See—*
Garrigues, Claude; Signouret, Jean Baptiste; and Chambu, Claude, 3,970,468.
Chano, Takashi; and Masuda, Koji, to Kayabakoyo-Kabushiki-Kaisha. Automatic sewing machine. 3,970,014, Cl. 112-121.110.
Chapman, Everett E.; Crocker, Thomas H.; and Levitt, Barry N., to United States of America, Air Force. Analog-to-pulse integrating converter. 3,970,943, Cl. 328-151.000.
Chapman, Russell W.: *See—*
Halcomb, Walter C.; Eastman, Naomi A.; Eastman, Robert D.; VanMeter, Harvey A.; and Chapman, Russell W., 3,969,874.
Charcon Tunnels Limited: *See—*
McBean, Rupert John Sidney, 3,969,906.
Charron, John R. E. Fishing lure. 3,969,840, Cl. 43-42.060.
Chase, Earle Merritt: *See—*
Gerber, Heinz Joseph; and Chase, Earle Merritt, 3,971,036.
Chase, Vance A.: *See—*
Copeland, Robert L.; Greene, Ralph F.; Beeler, David R.; Eastridge, Robert A.; and Chase, Vance A., 3,970,006.
Chatham, Cyril Gordon; and Long, Kenneth, to National Research Development Corporation. Spoil removal devices for tunnelling machines. 3,970,224, Cl. 222-370.000.
Chavanoz S.A.: *See—*
Neveux, Jacques, 3,969,883.
Chen, Jeffrey J.: *See—*
Savage, Elton Stuart; and Chen, Jeffrey J., 3,970,555.
Cheslow, Ernest, to Johnson & Johnson. Disposable diaper having tab fastening means with one end thereof releasably adhered to diaper. 3,970,086, Cl. 128-287.000.
Chester, Arthur N., to Hughes Aircraft Company. Waveguide laser arrangement for generating and combining a plurality of laser beams. 3,970,963, Cl. 331-94.50C.
Chevron Research Company: *See—*
Bacskai, Robert, 3,970,631.
Hotten, Bruce W., 3,970,568.
Katsumoto, Kiyoshi, 3,970,708.
Chicago Pneumatic Tool Company: *See—*
Schaedler, Raymond J.; and Marcantonio, Livio F., 3,970,110.
Chipchase, Frank D., to International Multifoods Corporation. Heating means for comestible kettle. 3,970,072, Cl. 126-391.000.
Christensen, Donald Ragnvald. Latchable matchbook with dividing striking strip. 3,970,193, Cl. 206-104.000.
Christie, Donald M., to Lawrence Peska Associates, Inc., a part interest. Ring, ball and cone retrieval apparatus. 3,970,308, Cl. 273-95.00A.
Chupka, David E.: *See—*
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Ciba-Geigy AG: *See—*
Hiestand, Armin; and Jager, Horst, 3,970,669.
Ciba-Geigy Corporation: *See—*
Dengler, Siegfried; Loew, Peter; Zickendraht, Christian; and Schwander, Hansrudolf, 3,970,675.
Jung, Hans Wolf; Maul, Rudolf; and Wehner, Hermann Wolfgang, 3,970,679.
Schutz, Hans Ulrich; Back, Gerhard; and Beffa, Fabio, 3,970,615.
Vlattas, Isidoros, 3,970,670.
Cibie Projecteurs: *See—*
Ricard, Jacques, 3,970,836.
Ciliberti, Frank, to P. R. Mallory & Co., Inc. Mercury trap and contact. 3,970,477, Cl. 136-107.000.
Cilloniz Oberti, Manuel. Process and apparatus for fiber wetting in spinning device of the ring-spindle-traveler type. 3,969,882, Cl. 57-35.000.
Cincinnati Milacron Chemicals, Inc.: *See—*
Molt, Kenneth R., 3,970,678.
Cindu N.V.: *See—*
Bongertman, Pieter Jan Willem, 3,970,542.
Cirri, Gianfranco, to Fabbrica Italiana Magneti Marelli, S.p.A. Sensor for accelerometers. 3,969,944, Cl. 73-516.0LM.
Citizen Watch Co., Ltd.: *See—*
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Clairol Incorporated: *See—*
Brody, Frederick; and Pohl, Stanley, 3,970,423.
Clark, Charles B.: *See—*
Baer, James A.; Clark, Charles B.; and Schaefer, Louis F., 3,970,036.
Clark, George Reed; and Winkleblack, Kenneth Charles, to Hewlett-Packard Company. Apparatus for measuring sheet resistivity of semiconductor materials and diffused layers. 3,970,923, Cl. 324-64.000.
Clark, Melville, Jr.; and Luce, David A., to Clark, Melville, Jr. Musical instrument with means for scanning keys. 3,969,968, Cl. 84-1.010.
Clark, Melville, Jr.; and Luce, David A., to Clark, Melville, Jr. Musical instrument with means for scanning keys. 3,969,969, Cl. 84-1.260.
Clark, Samuel A., Jr.; Lucey, George K., Jr.; and Zimmerman, Thomas H., to United States of America, Army. Protective metal shield for plastic fuze radomes. 3,971,024, Cl. 343-872.000.
Clay, Charles L. Quick opening/closing compression latch. 3,970,213, Cl. 220-324.000.
Claybaugh, Gene W., to Procter & Gamble Company, The. Hard surface cleaning compositions. 3,970,594, Cl. 252-524.000.
Clements, Ivor K.; and Spencer, George R., to Raytheon Company. Phase comparator. 3,970,868, Cl. 307-232.000.
Clemix Co.: *See—*
Andoh, Akira, 3,970,052.
CMI Corporation: *See—*
Swisher, George William, Jr.; Smith, Donald W.; and Phillips, John F., 3,970,405.
Coal Industry (Patents) Limited: *See—*
Williams, Derek Farnham; and Whitehead, John Charles, 3,970,541.
Coats, Charles L., Jr., to United States of America, Navy. Low power driver. 3,970,869, Cl. 307-251.000.
Cobb, G. Harold, to Tektronix, Inc. Erasure means for charge storage device. 3,970,889, Cl. 313-396.000.
Cobbe, George H., Jr. Safety device for use with chlorine cylinder valves. 3,970,284, Cl. 251-149.900.
Cochard, Pierre: *See—*
Henault, Claude; and Cochard, Pierre, 3,970,054.
Codo, Edward A., to Caterpillar Tractor Co. Filter and bypass valve arrangement. 3,970,563, Cl. 210-237.000.
Cohen, Choua; Durif Varambon, Durif; Salle, Robert; and Sillion, Bernard, to Institut Francais du Petrole, es Carburants et Lubrifiants et Entreprise de Recherches et d'Activities Petroliers Elf. 2,4-Quinazoline dione-polyamide-ester resins. 3,970,630, Cl. 260-30.200.
Coleman, Joe E.: *See—*
Jessup, Robert L.; and Coleman, Joe E., 3,970,147.
Colgate-Palmolive Company: *See—*
Barth, Jordan B., 3,970,747.
Castaneda, Rosa Maria, 3,970,087.
Klisch, Stephen Cajetan; and Martin, Charles Andrew, 3,970,596.
Collins, Paul W.; and Pappo, Raphael, to G. D. Searle & Co. 11,15-Dihydroxy-9-oxoprost-13-ynoic acid. 3,970,683, Cl. 260-468.00D.
Collins, Stephen M.; and Schweickart, Albert J., to BASF Wyandotte Corporation. End connector for filter press cell. 3,970,539, Cl. 204-254.000.

Collins, Stephen M.: *See—*
Barkel, Barry M.; Collins, Stephen M.; and Herring, William M., 3,970,516.

Colorflo Leasing Inc.: *See—*
Doane, Frank A., 3,970,119.

Colton, John Robert; Heick, Robert Bruce; and Mann, Henry, to Bell Telephone Laboratories, Incorporated. Common control signaling extraction circuit. 3,970,799, Cl. 179-15.0BY.

Combustion Engineering, Inc.: *See—*
Palmer, David Nelson, 3,970,504.
Thrash, Sammy DeWitt, 3,970,143.

Compagnie Francaise de Produits Industriels: *See—*
Askienazy, Alexandre; Melki, Georges; and Stevenin, Jean, 3,970,762.

Compagnie Honeywell Bull (Societe Anonyme): *See—*
Venker, Hilrich Jan Matthijs, 3,969,998.

Compagnie Industrielle des Piles Electriques "Cipel": *See—*
Cerfon, Pierre, 3,970,476.

Complexul Pentru Prelucrarea Lemnului Reghin: *See—*
Delu, Ion, 3,969,971.

Comstock, Donald W.; and Marchetti, Peter B., to Bellofram Corporation. Rolling diaphragm and rolling diaphragm devices. 3,969,991, Cl. 92-99.000.

Concast AG: *See—*
Schmid, Markus; and Bruderer, Werner, 3,970,135.

Cone-Blanchard Machine Company: *See—*
White, Philip H.; Wilterdink, Bernard W.; and Andrews, Guy J., 3,970,830.

Conforti, Robert F., to Hughes Aircraft Company. Arithmatic circuit for bang-bang seekers. 3,970,269, Cl. 244-3.160.

Connelly, William; Khan, Hamid Iqbal; and McEwan, Ian Hugh, to Canadian Industries, Ltd. Aqueous dispersions of thermosettable synthetic addition polymers with 1,2-epoxy resin plasticizer. 3,970,628, Cl. 260-29.6NR.

Connors, William P.; Glaenzer, Richard H.; Saum, George A.; and Wagner, Robert G., to United States of America, Navy. Lateral photodetector of improved sensitivity. 3,971,057, Cl. 357-30.000.

Continental Can Company, Inc.: *See—*
Herbst, Edward J.; and Peyser, Harry A., 3,970,023.
LaCross, George D., 3,970,211.
Pelton, Peter G.; and Ostrem, Obert M., 3,970,105.

Contraves AG: *See—*
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Voellmy, Hans Rudolf; and Gahwiler, Hermann, 3,970,097.

Control Data Corporation: *See—*
Procter, Samuel Anderson; and Younger, Robert Dewitt, 3,970,925.
Warmka, Gary Paul; and Hill, James Dan, 3,970,433.

Cooper, Cleveland N., to Pandjiris Weldment Co., The. Pipe fitting locator apparatus. 3,970,295, Cl. 269-17.000.

Cooper, Duane H. Monaural and stereo compatible multidirectional sound matrixing. 3,970,788, Cl. 179-1.0GQ.

Cooper, Edward. High speed, step-switching AC line voltage regulator with half-cycle step response. 3,970,918, Cl. 323-6.000.

Cooper, Rey W.: *See—*
Kopatz, William H.; Cooper, Rey W.; and Watson, Russell W., 3,970,022.

Coors, George T., to Ledex, Inc. Electric solenoid structure. 3,970,981, Cl. 335-266.000.

Copar Corporation: *See—*
Schmidt, Robert W.; Gallet, John R.; and Czyz, Thomas L., 3,970,489.

Copeland, Robert L.; Greene, Ralph F.; Beeler, David R.; Eastridge, Robert A.; and Chase, Vance A., to United States of America, Air Force. Protective cover for a missile nose cone. 3,970,006, Cl. 102-105.000.

Copenhefer, John E.; and House, Robert M., to United States Gypsum Company. Compact air filter. 3,970,440, Cl. 55-501.000.

Copp, John C. Optical visual communication system. 3,970,374, Cl. 350-301.000.

Corby, Nelson R., Jr.: *See—*
Gerhardt, Lester A.; Corby, Nelson R., Jr.; and Sims, Edward M., 3,971,068.

Cordes, Claus: *See—*
Horn, Peter; Cordes, Claus; and Pflueger, Richard, 3,970,634.

Cordes, William F., III; and Diehl, Robert E., to American Cyanamid Company. Ethyl α-cyano β-(N-methyl-N-cyclohexylamino) acrylate stabilizer. 3,970,639, Cl. 260-45.85A.

Corey, Garland G.: *See—*
Carmello, Robert; Salka, Barry A.; and Corey, Garland G., 3,970,576.

Corning Glass Works: *See—*
Gossie, Mijo A., 3,970,508.
Hollis, David L.; and Magner, Richard G., 3,970,845.

Costruzioni Meccaniche Lonati di Lonati Francesco & Figli (Ettore, Faust, Tiberio) S.n.c.: *See—*
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Cotton Incorporated: *See—*
Leblanc, Robert Bruce; and Leblanc, Destin A., 3,970,425.

Cotton, Larry G., to Iowa Mold Tooling Co., Inc. Tire servicing apparatus. 3,970,342, Cl. 294-86.00R.

Coulombe, Lionel J.; and Giaimo, Anthony, to Singer Company, The. Threading apparatus for sewing machines. 3,970,019, Cl. 112-245.000.

Coulter Electronics, Inc.: *See—*
Figueroa, David Richard; and Ginsberg, Guenter, 3,970,392.

Cowan, Jane E. H.: *See—*
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Crabbe, Pierre; Fried, John H.; and Guzman, Angel, to Syntex (U.S.A.) Inc. Polyunsaturated prostaglandin derivatives. 3,970,684, Cl. 260-468.00D.

Crabtree, Terence Edward: *See—*
Fry, Sidney; Crabtree, Terence Edward; and Rothery, Brian, 3,970,550.

Crandell, Walter R., to Fast Heat Element Manufacturing Co., Inc. Electrically heated torpedo. 3,970,821, Cl. 219-523.000.

Crete, Richard C. Photographic light support apparatus. 3,970,835, Cl. 240-1.300.

Crociata, Vincent J.: *See—*
Fisher, Donald H.; and Crociata, Vincent J., 3,970,382.

Crocker, Thomas H.: *See—*
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Cromwell, Nicholas O., to Foxboro Company, The. Computer-directed process control system with interactive display functions. 3,971,000, Cl. 340-172.500.

Crosby, Lawton H., to Morley Furniture Spring Corporation. Spring construction. 3,969,793, Cl. 24-84.00B.

Crosfield Electronics Limited: *See—*
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Cross Manufacturing, Inc.: *See—*
Ailshie, Roger Howard, 3,970,108.

Cross, Peter E.; Dickinson, Roger P.; and Kemp, John E. G., to Pfizer Inc. Tetrahydro-carbazole derivatives as gastric anti-secretory agents. 3,970,757, Cl. 424-274.000.

Crowe, Lloyd L., to Depke, Shirley L. Method of making reversible hooked articles. 3,970,338, Cl. 289-1.500.

Cruse, Teddy Howard: *See—*
Murphy, Frank W., Jr.; Nunneley, J. David; and Cruse, Teddy Howard, 3,970,099.

Culbertson, Linda R.: *See—*
Culbertson, William E.; and Culbertson, Linda R., 3,970,217.

Culbertson, William E.; and Culbertson, Linda R., to Lawrence Peska Associates, Inc., a part interest. Coin-operable packaged diaper dispensing machine. 3,970,217, Cl. 221-80.000.

Curington, Alfred R.; and Roscoe, Theodore J., Jr., to Bakerdrill, Inc. Dual concentric pipes. 3,970,335, Cl. 285-133.00A.

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Hansen, James E.; and Schmit, Eugene R., 3,970,908.
Jaskolski, Stanley V.; Lade, Robert W.; Schutten, Herman P.; Spellman, Gordon B.; and Van Horn, Lawrence E., 3,971,056.

Czaja, Robert F.: *See—*
Tull, Roger J.; Czaja, Robert F.; Shuman, Richard F.; and Pines, Seemon H., 3,970,693.

Czyz, Thomas L.: *See—*
Schmidt, Robert W.; Gallet, John R.; and Czyz, Thomas L., 3,970,489.

Dachicourt, Augustin; and Krin, Rene, to Regie Nationale des Usines Renault; and Automobiles Peugeot. Oil and air suspension devices. 3,970,292, Cl. 267-64.00R.

Dahl, Flemming. Support for patients in beds or chairs. 3,970,077, Cl. 128-33.000.

Dahmen, Manfred; Ritzhaupt, Anneliese; and Zurheide, Manfred, to International Business Machines Corporation. Method of manufacturing a power transistor. 3,970,487, Cl. 148-187.000.

Dai Nippon Toryo Co., Ltd.: *See—*
Tugukuni, Hideyoshi; and Kano, Masafumi, 3,970,725.

D'Alelio, Gaetano F. Halogenated esters of phosphorus-containing acids. 3,970,727, Cl. 260-932.000.

Dalton, Brian L.; and Judd, Edward J., to Crosfield Electronics Limited. Apparatus for maintaining the position of a working head in relation to a cylindrical workpiece. 3,970,781, Cl. 178-7.600.

Daly, Robert M.; Mekota, John E., Jr.; and Goss, Gary J., to Honeywell Information Systems, Inc. High speed peripheral system interface. 3,970,997, Cl. 340-172.500.

Dalzell, Chester G.; and Pace, Burton D., to TRW Inc. Tape dispenser and method of dispensing tape. 3,970,507, Cl. 156-446.000.

Danfoss A/S: *See—*
Hansen, Egon Jorgen, 3,970,282.
Ohrberg, Carl Verner, 3,969,986.

Dare Products, Incorporated: *See—*
Wilson, Robert M., 3,970,101.

Darling, Robert D. Ladder bridging device. 3,970,170, Cl. 182-230.000.

Date, Masakazu: *See—*
Maeda, Kozo; and Date, Masakazu, 3,970,422.

Datlow, Bernard J., to Datlow, Bernard J. Additive composition for textile bleaching baths. 3,970,578, Cl. 252-186.000.

Davidson, Raymond John. Metal, particularly gold, recovery from adsorbed cyanide complexes. 3,970,737, Cl. 423-27.000.

Davies, Terrence Ardern, to Square D Company. Electrical contact materials and methods of making the same. 3,970,451, Cl. 75-173.00R.

Davis, Lee A., to I-T-E Imperial Corporation. Integrated circuit linear time delay extender for static relays. 3,970,899, Cl. 317-33.00R.

Davison, Sol, to Shell Oil Company. Substrate coated with mixed resin primer coat comprising a block copolymer. 3,970,771, Cl. 428-425.000.

Day, Paul L., to Park-Ohio Industries, Inc. Apparatus for inductively heating the end of an elongated workpiece. 3,970,813, Cl. 219-10.570.

Dayton-Hudson Corporation: *See—*
Moore, Charles T., 3,969,838.
Deaton, Charles U. Baffle assembly and illuminator grid. 3,969,870, Cl. 52-645.000.
Debaigt, Jean, to C.G.E.E.-Alsthom. Device for fixing an object. 3,970,276, Cl. 248-223.000.
De Bruine, Carl, to Lear Siegler, Inc. Control circuitry for vehicle guidance mechanism. 3,970,840, Cl. 250-202.000.
DEC International, Inc.: *See—*
Huang, Min-Nan; and Walter, Neil F., 3,969,996.
Dechavanne, Jacques. Dynamic-static shaft seal. 3,970,321, Cl. 277-188.00A.
Decker, Maurice S.; and Downey, George T., to Midland-Ross Corporation. Fuel filter bypass valve with condition preliminary indicator and secondary indicator. 3,970,104, Cl. 137-494.000.
Deering Milliken Research Corporation: *See—*
Stark, Sven Olof Soren; Rauser, Jan Axel Ingemar; and Rauser, Irma Marita, 3,970,426.
Stewart, William H., Jr., 3,969,779.
De Gennes, Gerard, to Societe Anonyme Francaise du Ferodo. Closed-loop type disc brake. 3,970,172, Cl. 188-73.400.
Dehne, Wilfried E. Index drive system cam follower assembly. 3,969,954, Cl. 74-569.000.
Deike, Robert F., to Foresight Industries. Torque fin anchor. 3,969,853, Cl. 52-156.000.
Deike, Robert F., to Foresight Industries. Planing fin anchor. 3,969,854, Cl. 52-163.000.
Deisinger, Franz; Husges, Gert; Bock, Erich; Niestroj, Heinrich; and Henzgen, Detlef, to Schubert & Salzer Maschinenfabrik Aktiengesellschaft. Selection apparatus for pattern control elements. 3,969,910, Cl. 66-50.00R.
Dektor Counterintelligence and Security, Inc.: *See—*
Bell, Allan D., Jr.; Ford, Wilson H.; and McQuiston, Charles R., 3,971,034.
DeLalio, George M. Synchronously shiftable dual range planetary transmission with coaxial input shafts. 3,969,957, Cl. 74-687.000.
Del Puppo, Louis, to Societe Anonyme: SABLA. Apparatus for handling large and heavy objects. 3,970,205, Cl. 214-652.000.
Delu, Ion, to Complexul Pentru Prelucrarea Lemnului Reghin. Instrument system and stringed-instruments therefor. 3,969,971, Cl. 84-274.000.
Demag Aktiengesellschaft: *See—*
von Wendt, Karl Freiherr; and Becker, Klaus, 3,970,300.
DeMusis, Ralph T. Turbine blade air seal edge grinder. 3,969,848, Cl. 51-141.000.
Diegler, Siegfried; Loew, Peter; Zickendraht, Christian; and Schwander, Hansrudolf, to Ciba-Geigy Corporation. Disperse dyestuffs. 3,970,675, Cl. 260-364.000.
Dennen, Robert S., to Recreational & Scientific Devices, Inc. Flexible cord locking device. 3,969,914, Cl. 70-234.000.
Densow, Ulrich O., to Outboard Marine Corporation. Chain saw clutch with engaging and releasing centrifugal weights. 3,970,178, Cl. 192-105.0BA.
Depke, Shirley L.: *See—*
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Derrick Manufacturing Corporation: *See—*
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Derrick, Robert G.: *See—*
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Detex Corporation: *See—*
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Deutsche Gold- und Silber-Scheideanstalt vormals Roessler: *See—*
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Deutschmann, William B.; Livenick, Corwin E.; Paulsen, Robert W.; Tyler, Len A.; and Rose, Clifford L., to Motorola, Inc. Crystal mounting structure and method of assembly. 3,970,880, Cl. 310-9.400.
Dezelan, Joseph E., to Caterpillar Tractor Co. Suspension and load leveling for an urban hauler. 3,970,327, Cl. 280-683.000.
Dhami, Kewal Singh, to International Telephone and Telegraph Corporation. Wire coated with fluorocarbon polymers cross-linked with dialyl ester of 4,4'-dicarboxydiphenyl ester. 3,970,770, Cl. 428-379.000.
Diamond International Corporation: *See—*
Peppler, William S.; Keen, Everett M.; and Siciliano, Anthony J., 3,970,044.
Diamond Shamrock Corporation: *See—*
Gunn, Walter H., 3,970,482.
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Horn, Herman; Greenbaum, Sheldon B.; Ely, Charles M.; Hacke, Walter; and Olle, David A., 3,970,648.
Ihde, Frederick J., Jr., 3,970,620.
Stillman, Neil W., 3,970,462.
DiBuono, Frank M. Shaving moisturizer device. 3,969,817, Cl. 30-41.000.
Dickens, Elmer Douglas, Jr., to B. F. Goodrich Company, The. Smoke retardant vinyl chloride and vinylidene chloride polymer compositions. 3,970,638, Cl. 260-45.75N.
Dickinson, Roger P.: *See—*
Cross, Peter E.; Dickinson, Roger P.; and Kemp, John E. G., 3,970,757.
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Dieterich, Dieter: *See—*
Weber, Karl-Arnold; Reiff, Helmut; and Dieterich, Dieter, 3,970,601.
Diggs, Richard E. System for energy storage and DC to AC conversion. 3,970,917, Cl. 322-4.000.
Dillon, Oscar W., to Cashin Systems Corporation. Apparatus for slicing meat products. 3,969,966, Cl. 83-340.000.
Di Matteo, Paul L.; Ross, Joseph A.; and Stern, Howard K., to Dynell Electronics Corporation. Three-dimensional display system. 3,970,361, Cl. 350-144.000.
Dingwall, Andrew Gordon Francis, to RCA Corporation. Memory cell with decoupled supply voltage while writing. 3,971,004, Cl. 340-173.0FF.
Director-General of the Agency of Industrial Science and Technology: *See—*
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Terajima, Kazuki; Tomita, Shigeru; Matsuda, Yoshindo; and Abe, Keiji, 3,970,553.
Distler, Jack Edward, to Bell Telephone Laboratories, Incorporated. Multiple switch. 3,970,806, Cl. 200-5.00R.
Dittmar, Bruce Ivor, to Du Pont de Nemours, E. I., and Company. Dialkyl 1,1'-(optionally substituted hydrocarbylenebiscarbamoyl)bis(2-benzimidazolecarbamates). 3,970,668, Cl. 260-309.200.
Diversified Products, Inc.: *See—*
Westmoreland, James P., Jr., 3,970,316.
Doane, Frank A., to Colorflo Leasing Inc. Method and apparatus for manufacture of disposable thermometers. 3,970,119, Cl. 141-1.00R.
Dockus, Kostas F., to Borg-Warner Corporation. Method of brazing aluminum parts. 3,970,237, Cl. 228-208.000.
Dr. Molter GmbH: *See—*
Aeschlimann, Hans-Peter, 3,970,245.
Doherty, Thomas E.: *See—*
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Doin, Bernard J.; Plantif, Bernard E.; and Tillac, Jean-Francois, to Societe Nationale des Poudres et Explosifs. Device for winding a seat belt in vehicles. 3,970,266, Cl. 242-107.40R.
Dolenc, Anton; and Herter, Anton, to Escher Wyss Limited. Flexure compensating roll. 3,969,801, Cl. 29-116.0AD.
Dollhausen, Manfred: *See—*
Muller-Albrecht, Horst; Quiring, Bernd; Dollhausen, Manfred; and Wulff, Jochen, 3,970,717.
Dolza, Claudio. Method and apparatus for laying pipelines. 3,969,905, Cl. 61-111.000.
Doody, Richard D., to United States of America, Air Force. Cold cylinder assembly for cryogenic refrigerator. 3,969,907, Cl. 62-6.000.
Dornier System GmbH: *See—*
Hepp, Wolfgang; and Wirtzfeld, Alexander, 3,970,076.
Dorrell, Robert Francis; and Janatka, Joseph, to Bunker Ramo Corporation. Electrical connector having improved contact retention system. 3,970,352, Cl. 339-59.00M.
Doser, Manfred; and Jones, Frederick G., to Hitachi Magnetics Corporation. Sintering methods for cobalt-rare earth alloys. 3,970,484, Cl. 148-103.000.
Doser, Manfred, to Hitachi Magnetics Corporation. Binder and lubricant removal from cobalt-rare earth alloys. 3,970,485, Cl. 148-103.000.
Douwe Egberts Koninklijke Tabaksfabriek-Koffiebranderijen-Theehandel N.V.: *See—*
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Dowty Rotol Limited: *See—*
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Doyle, William C., Jr., to Gulf Research & Development Company. Selectively herbicidal 2-substituted-4H-3,1-benzoxazin-4-ones. 3,970,652, Cl. 260-244.00R.
Drabert Sohne: *See—*
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Dravo Corporation: *See—*
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Drews, Wolf-Dietrich, to Siemens Aktiengesellschaft. Ultrasonic liquid atomizer. 3,970,250, Cl. 239-102.000.
Droske, Klaus, to Volkswagenwerk Aktiengesellschaft. Lock. 3,969,915, Cl. 70-364.00R.
DuBois, Donald E. Buckle with removable display insert. 3,969,836, Cl. 40-21.00C.
Duffield, Peter Leonard, to Mead Corporation, The. Apparatus and method for initiating formation of a filament of coating liquid. 3,970,222, Cl. 222-148.000.
Dumas, Guy H., to Silec-Semi-Conducteurs. Photosensitive junction devices having controllable sensitivity. 3,970,843, Cl. 250-211.00J.
Dumas, John R.: *See—*
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Dumitrescu, Nicolae: *See—*
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Dungan, William J.: *See—*
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Dunkley, James L.; and Liang, Victor K. C., to National Semiconductor Corporation. Complementary bipolar transistors having collector diffused isolation. 3,971,059, Cl. 357-44.000.

Du Pont de Nemours, E. I., and Company: *See—*
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Braun, Robert A., 3,970,687.
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Hoffman, Lewis Charles; McMunn, Charles William; Mones, Arthur Harvey; and Short, Oliver Alton, 3,970,590.
Niedzielski, Edmund Luke, 3,970,574.
Reader, John R., Jr.; Seago, James L.; and Williamson, James A., Jr., 3,970,430.
Seymus, Herman Ernest, 3,970,627.

Dupuis, Maurice Victor; and Hohman, Frederick William. Carbon brush assembly. 3,970,882, Cl. 310-245.000.

Durant, Graham John, to Smith Kline & French Laboratories Limited. Imidazo[1,2-a]pyridines. 3,970,753, Cl. 424-263.000.

Durif Varambon, Durif: *See—*
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Duveau, Francois. Fluid distribution apparatus and method. 3,970,413, Cl. 417-7.000.

Dygos, John H., to G. D. Searle & Co. 5-(1,2,3,4-Tetrahydro-6-methoxy-2-naphthyl)-2-hydroxy-1-methylcyclopentaneethanols and esters. 3,970,686, Cl. 260-476.00C.

Dynell Electronics Corporation: *See—*
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Eastman, Naomi A.: *See—*
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Eastman, Robert D.: *See—*
Halcomb, Walter C.; Eastman, Naomi A.; Eastman, Robert D.; VanMeter, Harvey A.; and Chapman, Russell W., 3,969,874.

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Ebata, Hiroyuki, to Yoshida Kogyo Kabushiki Kaisha. Concealed zipper fastener. 3,969,794, Cl. 24-205.11F.

Ebstein, John W.; and Cambardella, Mario, to Gabriel Industries, Inc. Basketball backboard and support. 3,970,304, Cl. 273-1.50R.

Echterhoff, Heinrich: *See—*
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Edelman, Seymour; Roth, Steven C.; and Mayo-Wells, John F., to United States of America, Navy. Polymeric sensor of vibration and dynamic pressure. 3,970,862, Cl. 307-88.0ET.

Edmonds, James T., Jr., to Phillips Petroleum Company. Preparation of block copolymers. 3,970,719, Cl. 260-878.00B.

Edwards, Roy Q.: *See—*
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Eenink, Johannes Gerardus Leon: *See—*
Black, Bill Adby; and Eenink, Johannes Gerardus Leon, 3,970,158.

Eheim, Franz; Hofer, Gerald; Konrath, Karl; and Laufer, Helmut, to Robert Bosch G.m.b.H. RPM regulator for fuel injection pumps. 3,970,064, Cl. 123-139.0ST.

Eisenwerk-Gesellschaft Maximiliansnutte mbH: *See—*
Brotzmann, Karl; Fassbinder, Hans Georg; Hofer, Friedrich Karl; and Mantey, Paul-Gerhard, 3,970,444.

Elion, Glenn R.; and Klink, Arthur E., to Merck & Co., Inc. Preparation of cyanopyridines. 3,970,657, Cl. 260-294.900.

Elion, Glenn R.; and Klink, Arthur E., to Merck & Co., Inc. Preparation of cyanopyridines. 3,970,659, Cl. 260-294.900.

Elitex, Zavody textilniho strojirenstvi generalni reditelstvi: *See—*
Kouklik, Ivo, 3,969,912.

Elkem-Spigerverket A/S: *See—*
Arnesen, Arne Georg; and Schokkenbroek, Jan, 3,970,814.

Ellington, Gordon H.: *See—*
Meadows, James L.; Smith, Donald H.; Ellington, Gordon H.; Mitchell, William O.; and Frost, W. Wade, 3,970,021.

Elliott, Douglas Ernest: *See—*
Virr, Michael John; and Elliott, Douglas Ernest, 3,970,011.

Ellis, Paul H., to United States of America, Army. Folding weapon sight. 3,969,827, Cl. 33-255.000.

Elward, John S., to Hewlett-Packard Company. Memory expansion apparatus. 3,970,999, Cl. 340-172.500.

Ely, Charles M.: *See—*
Horn, Herman; Greenbaum, Sheldon B.; Ely, Charles M.; Hacke, Walter; and Olle, David A., 3,970,648.

Emco Ltd.: *See—*
Bower, Allen M., 3,970,107.

Emery Industries, Inc.: *See—*
Sturwold, Robert J.; and Barrett, Fred O., 3,970,569.

Emery, William M.: *See—*
Lawless, John F.; Ohrin, Leonard J.; and Emery, William M., 3,969,908.

Engelhard, Bruno: *See—*
Scharfe, Gerhard; Schwerdtel, Wulf; Swodenk, Wolfgang; Engelhard, Bruno; Grolig, Johann; Martin, Manfred; and Reissinger, Karl-Hermann, 3,970,713.

Engelmann, Manfred: *See—*
Brotz, Walter; Engelmann, Manfred; and Rieger, Klaus, 3,970,624.

English Electric Valve Company Limited: *See—*
Wilcox, David Mark; and Rivers, William David Richard, 3,970,768.

Englund, G. Roland, to Svenska Dataregister AB. Indexing mechanism. 3,969,945, Cl. 74-128.000.

Enlow, William Palmer: *See—*
Hechenbleikner, Ingenuin; and Enlow, William Palmer, 3,970,532.

Ennis, Robert E.; and Derrick, Robert G., to Linatex Corporation of America; and Derrick Manufacturing Corporation. Screen assembly and dewatering technique. 3,970,549, Cl. 209-341.000.

Enoch, Reginald David; and Jones, Mervyn Evan, to Post Office, The. Magnetic bubble shift register. 3,971,037, Cl. 340-174.0TF.

Enriki, Kiyoshi: *See—*
Yoshiura, Hirohisa; Arai, Toshiharu; Miyake, Masao; and Enriki, Kiyoshi, 3,970,632.

Enterprise Machine and Development Corporation: *See—*
Polney, Richard J., 3,969,799.

Environmental Research & Technology, Inc.: *See—*
Blau, Henry H., Jr.; and Kebabian, Paul L., 3,970,375.

Epenoy, Gabriel; and Vautier, Remi, to International Business Machines Corporation. Time division multiplex data transmission system. 3,970,798, Cl. 179-15.0AF.

Erdelyan, Steven, to International Harvester Company. Lockable suspension system for a scraper. 3,969,835, Cl. 37-129.000.

Erlicki, Michael S.: *See—*
Tamir, David; and Erlicki, Michael S., 3,970,897.

Erwin Sick Optik-Elektronik: *See—*
Plockl, Johann, 3,970,825.

Esaki, Shigeru; Murata, Shigeru; Ishida, Matsuhiko; and Kito, Katsumi, to Mitsubishi Denki Kabushiki Kaisha. Safety device for passenger conveyor. 3,970,187, Cl. 198-16.00R.

Escher Wyss Limited: *See—*
Bucher, Albert, 3,970,244.
Dolenc, Anton; and Herter, Anton, 3,969,801.

Esposito, Vito M.; and Weinstein, Stanley B., to American Hospital Supply Corporation. Process for reducing sticking of blood cells to glass in blood testing procedures. 3,970,427, Cl. 23-230.00B.

Esterline Corporation: *See—*
Mason, Charles F., 3,971,041.

Etablissements Lardenois: *See—*
Lardenois, Robert A., 3,970,093.

Etablissements Metallurgiques du Val d'Ambv: *See—*
Gimaret, Pierre Louis, 3,970,736.

Etat Francais: *See—*
Boisrayon, Gerald Marc Albert; Martin, Gilbert Marius Henri; and Fagnen, Edmond G., 3,969,903.

Etudes et Fabrications Aeronautiques: *See—*
Pravaz, Marcel, 3,969,772.

Etzbach, Volker; Forg, Wolfgang; and Grimm, Peter, to Linde Aktiengesellschaft. Cascaded refrigeration cycles for liquefying low-boiling gaseous mixtures. 3,970,441, Cl. 62-28.000.

Euchner, William H., Jr.: *See—*
Bates, Wayne J.; Berenson, Walter L.; Euchner, William H., Jr.; Grigg, James H.; Stern, Morton; and Taylor, Ronald W., 3,970,937.

Even, Reed Kamenetzky, to Bell Telephone Laboratories, Incorporated. Digital frequency multiplier. 3,970,954, Cl. 331-53.000.

Evers, Carl A.; Wolf, Harold G., Jr.; and Kravitz, Howard S., to Uniroyal, Inc. Flame resistant thermoplastic blend. 3,970,716, Cl. 260-859.00R.

Evers, William J.: *See—*
Sanderson, Anne; Schreiber, William L.; van Praac, Michel; Pittet, Alan O.; and Evers, William J., 3,970,701.

Ewers, Ronald L., to Toro Company, The. Fastening construction for playground equipment. 3,969,871, Cl. 52-721.000.

Exxon Research and Engineering Company: *See—*
Frankenfeld, John W.; and Wright, Donald L., 3,970,759.
Reeder, Perry E.; and Williams, Leonard M., 3,970,740.
Taylor, William F.; and Lieberman, Martin, 3,970,588.
Zaborsky, Oskar R.; and Laskin, Allen I., 3,970,521.

F. J. Gattys Verfahrenstechnik GmbH, Firma: *See—*
Hahn, Horst, 3,970,159.

Fabbrica Italiana Magneti Marelli, S.p.A.: *See—*
Cirri, Gianfranco, 3,969,944.

Fabinski, Walter: *See—*
Faulhaber, Reimar; Ascherfeld, Margareta; and Fabinski, Walter, 3,970,387.

Fagan, Lloyd D.; and Tripp, Gareth A., to Intersil Incorporated. Dual emitter programmable memory element and matrix. 3,971,058, Cl. 357-36.000.

Fagnen, Edmond G.: *See—*
Boisrayon, Gerald Marc Albert; Martin, Gilbert Marius Henri; and Fagnen, Edmond G. 3,969,903.

Falkenstein, Georg; Palm, Richard; and Wolff, Dietrich, to BASF Aktiengesellschaft. Stable, liquid solutions of isocyanurate-polyisocyanates containing amide and/or acylurea groups. 3,970,600, Cl. 260-77.5NC.

Fan, Albert K.; and Tecotzky, Melvin, to United States Radium Corporation. Alpha barium zinc cadmium sulfide phosphors and method. 3,970,582, Cl. 252-301.60S.

Fan, George J., to International Business Machines Corporation. Method and apparatus for applying magnetic liquid droplets to a recording surface. 3,971,033, Cl. 346-1.000.

Farley, David L.: *See—*
Barrington, Burchus Q.; Farley, David L.; and Morrisett, O. L., 3,969,937.

Farrington, Gregory C.: *See—*
Roth, Walter L.; and Farrington, Gregory C., 3,970,473.

Fassbinder, Hans Georg: *See—*
Brotzmann, Karl; Fassbinder, Hans Georg; Hofer, Friedrich Karl; and Mantey, Paul-Gerhard, 3,970,444.

Fast Heat Element Manufacturing Co., Inc.: *See—*
Crandell, Walter R., 3,970,821.

Faulhaber, Reimar; Ascherfeld, Margareta; and Fabinski, Walter, to Hartmann & Braun Aktiengesellschaft. Nondispersion, two beam, infrared gas analyzer. 3,970,387, Cl. 356-51.000.

Faulstich, George W., to Three Sisters Ranch Enterprises. Plastic stopper for wine bottle or the like. 3,970,207, Cl. 215-296.000.

Faulstich, Marga, to Jenaer Glaswerk Schott & Gen. Chemically stable optical glass. 3,970,466, Cl. 106-54.000.

Fazekas, Josef: *See—*
Stecher, Friedhelm; Fazekas, Josef; Johren, Paul; and Morsbach, Martin, 3,970,322.

Featherstone, Sammie W. Horseshoe. 3,970,149, Cl. 168-25.000.

Fedder, Tobe T. Animation method and system. 3,970,379, Cl. 352-52.000.

Feeney, George W.; and Burroway, Gary L., to Goodyear Tire & Rubber Company, The. Adhesive composition containing a copolymer of butadiene, styrene, and acrylonitrile, plus a tackifying resin. 3,970,623, Cl. 260-27.0BB.

Fein, Michael E.: *See—*
Bode, Wolfgang W.; Fein, Michael E.; and Hinson, David C., 3,970,886.

Feingold, Michael H.: *See—*
Bader, Henry; and Feingold, Michael H., 3,970,616.

Feldman, Jacob Richard; Haas, Gerhard Julius; and Lugay, Joaquin Castro, to General Foods Corporation. Nutritionally improved foodstuffs. 3,970,520, Cl. 195-29.000.

Fenn, John B., Jr; and Welkowsky, Murray S., to Xonics, Inc. Direct charge readout electron-radiography chamber. 3,970,844, Cl. 250-213.0VT.

Fenne, Kenneth R., to Quasar Electronics Corporation. Modular control panel device for audio-visual receiving apparatus. 3,970,782, Cl. 178-7.900.

Fester, Walter: *See—*
Ruchlak, Kasimir; Albers, Ernst-August; and Fester, Walter, 3,970,610.

FF & L Industries, Inc.: *See—*
Foehn, Robert C., 3,971,010.

Fiat Societa per Azioni: *See—*
Goodacre, Charles Lindsay, 3,970,053.

Fiber Science, Inc.: *See—*
Ashton, Larry J.; and Abildskov, Dale P., 3,970,495.

Field, Nathan D.; and Williams, Earl P., to GAF Corporation. N-vinyl lactam interpolymers useful as thickening agents. 3,970,606, Cl. 526-260.000.

Fields, Ellis K., to Standard Oil Company. Nitrile process. 3,970,658, Cl. 260-294.900.

Fierz, Max: *See—*
Zellweger, Jurg; and Fierz, Max, 3,969,983.

Figueroa, David Richard; and Ginsberg, Guenter, to Coulter Electronics, Inc. Analog to digital to analog storage and retrieval for a plurality of photometric blanking values. 3,970,392, Cl. 356-179.000.

Findley, Gerald Ivan; and Anderson, Teddy Lee, to International Business Machines Corporation. Electronic horizontal shifting and variable print width in a buffered printer. 3,971,044, Cl. 354-9.000.

Finger, John F.; and Pachop, Merle E., to Sioux Steam Cleaner Corporation. Low pressure steam generator. 3,970,048, Cl. 122-328.000.

Finkl, Charles W.: *See—*
Wilson, William, Jr.; and Finkl, Charles W., 3,970,448.

Finnila, Charles A., to Hughes Aircraft Company. Cooperative-word linear array parallel processor. 3,970,993, Cl. 340-172.500.

Firestone Tire & Rubber Company, The: *See—*
Bouton, Thomas C.; and Futamura, Shingo, 3,970,607.
Kyker, Gary Stephen; Antkowiak, Thomas Anthony; and Halasa, Adel Farhan, 3,970,533.

Fischer, Joachim; Knorre, Helmut; and Pohl, Gerhard, to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler. Process for detoxification of cyanides and nitriles with peroxygen compounds. 3,970,554, Cl. 210-62.000.

Fischli, Albert Eduard: *See—*
Mayer, Hans Johann; Fischli, Albert Eduard; Klaus, Michael Josef; and Wick, Alexander Eduard, 3,970,674.

Fisher, Donald H.; and Crociata, Vincent J., to Xerox Corporation. Spatially selective optical system. 3,970,382, Cl. 355-4.000.

Fisher, John A. Modular floating load-supporting assemblage. 3,970,024, Cl. 114-.50F.

Fleck, Fritz: *See—*
Balzer, Hans; Fleck, Fritz; and Schmid, Hans-Rudolf, 3,970,647.

Fleischer, Barry. Applicator system for fluids. 3,970,221, Cl. 222-145.000.

Flint, Theodore R. Hot-melt adhesive with self-melting capability. 3,970,395, Cl. 401-1.000.

Fluidfire Development Limited: *See—*
Virr, Michael John; and Elliott, Douglas Ernest, 3,970,011.

Foehn, Robert C., to FF & L Industries, Inc. Ballasted load control system and method. 3,971,010, Cl. 340-310.00R.

Fogel, Samuel; Foster, Patricia L.; Schenck, Paula; and Walker, William W., Jr., to American Bioculture, Inc. Soil treatment methods. 3,969,844, Cl. 47-58.000.

Ford, Wilson H.: *See—*
Bell, Allan D., Jr.; Ford, Wilson H.; and McQuiston, Charles R., 3,971,034.

Foresight Industries: *See—*
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Deike, Robert F., 3,969,854.

Forg, Wolfgang: *See—*
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Forgo, Laszlo: *See—*
Heller, Laszlo; Forgo, Laszlo; and Bakay, Arpad, 3,970,140.

Forney, Albert J.: *See—*
Gasior, Stanley J.; Forney, Albert J.; Haynes, William P.; and Kenny, Richard F., 3,970,434.

Fosdick, Dale P.: *See—*
Rosaen, Borje O., 3,970,566.

Foster, Harry C., to Carborundum Company, The. Solid waste shredder. 3,970,255, Cl. 241-186.00R.

Foster, Patricia L.: *See—*
Fogel, Samuel; Foster, Patricia L.; Schenck, Paula; and Walker, William W., Jr., 3,969,844.

Foxboro Company, The: *See—*
Cromwell, Nicholas O., 3,971,000.

Frank W. Murphy Manufacturer, Inc.: *See—*
Murphy, Frank W., Jr.; Nunneley, J. David; and Cruse, Teddy Howard, 3,970,099.

Frankenfeld, John W.; and Wright, Donald L., to Exxon Research and Engineering Company. Aliphatic diols as preservatives for cosmetics and related products. 3,970,759, Cl. 424-343.000.

Franklin, D. E. Self-supporting lighting fixture. 3,969,849, Cl. 52-28.000.

Franklin, Veatrice. Crochet needle storage and dispensing device. 3,970,195, Cl. 206-380.000.

Fraze, Ermal C.: *See—*
Brown, Omar L., 3,970,212.

Fredriksson, Henning; and Helde, Sven Ake. Reel for storing an elongated pliable member. 3,970,264, Cl. 242-96.000.

Freeman, Amihay: *See—*
Sokolovsky, Mordechai; Freeman, Amihay; and Goldstein, Leon, 3,970,597.

Freeman, Leo B., Jr.; Incerto, Robert J.; and Petrosky, Joseph A., Jr., to International Business Machines Corporation. High common mode rejection differential amplifier utilizing enhancement depletion field effect transistors. 3,970,950, Cl. 330-30.00D.

Freiberg, Leslie Alan, to Abbott Laboratories. Process for the conversion of niddamycin to leucomycin A_1, leucomycin A_3, carbomycin B and other antibiotics and related 3-O-esters. 3,970,642, Cl. 536-17.000.

Fried, John H.: *See—*
Crabbe, Pierre; Fried, John H.; and Guzman, Angel, 3,970,684.

Friedman, Jerome. Die holder. 3,970,179, Cl. 192-138.000.

Friedrichs, Jerome Peter, to Motorola, Inc. Method and apparatus for a thermistor compensated oven. 3,970,818, Cl. 219-210.000.

Friese, Hermann, to Sud-Chemie AG. Hydrolysis of oat husks. 3,970,712, Cl. 260-635.00C.

Fritz Gegauf Aktiengesellschaft, Bernina-Nahmaschinenfabrik: *See—*
Grubenmann, Manfred, 3,970,984.

Froman, Griff W.; and Mullins, Albert Ray, to Inland Steel Company. Electrolytic treating apparatus. 3,970,537, Cl. 204-211.000.

Frost, W. Wade: *See—*
Meadows, James L.; Smith, Donald H.; Ellington, Gordon H.; Mitchell, William O.; and Frost, W. Wade, 3,970,021.

Fry, Sidney; Crabtree, Terence Edward; and Rothery, Brian, to BBA Group Limited. Moulded elastomeric screen mat for sieving devices. 3,970,550, Cl. 209-399.000.

Fuji Photo Film Co., Ltd.: *See—*
Ishizuka, Akio; and Ogata, Yasuhiro, 3,970,500.
Kato, Hajime; and Hayashi, Takao, 3,970,769.
Matsukawa, Hiroharu; Katayama, Shizuo; and Kiritani, Masataka, 3,970,585.
Miyamoto, Akio; and Saeki, Keiso, 3,970,501.
Shiba, Keisuke; Hinata, Masanao; Sato, Akira; Ogawa, Akira; and Kato, Hirotetu, 3,970,461.
Tani, Tadaaki, 3,970,459.

Fujikura Cable Works, Ltd., The: *See—*
Takizawa, Jun; Oshima, Kazuyuki; Yamamoto, Hikaru; Kuribayashi, Kooji; and Suzuki, Toshio, 3,969,807.

Fujiwara, Akinobu. Key release type burglar alarm. 3,971,009, Cl. 340-276.000.

Fujiwara, Hiroshi; Asano, Koichi; Sugishita, Akio; and Takahashi, Asao, to Maruzen Oil Co. Ltd. Graft copolymer and process for preparation thereof. 3,970,534, Cl. 204-159.170.

Fukasawa, Toshiro: *See—*
Takagi, Katsuhide; and Fukasawa, Toshiro, 3,970,378.

Fukuhara, Teruo: *See—*
Sasajima, Ken-ichi; Doi, Muneharu; Fukuhara, Teruo; Yokota, Akira; Nakao, Yoshio; and Yoneda, Masahiko, 3,970,522.

Fukui, Osamu: *See—*
Ogihara, Sadahide; Nakamura, Yoichi; and Fukui, Osamu, 3,970,722.

Fukumoto, Shigeru, to Kabushiki Kaisha Suncrux Research Office. Electronically controlled timepieces using liquid crystal display elements. 3,969,887, Cl. 58-50.00R.

Fukusen, Hiroshi: *See—*
Shiraishi, Tatsuo; Fukusen, Hiroshi; Oishi, Sachio; Shimizu, Shinkichi; Nishikawa, Hiroyuki; and Wakabayashi, Tetsu, 3,970,739.

Fukuyama, Hiromasa, to Nippon Seiko Kabushiki Kaisha. Porous, static pressure air bearing device in a dentist's handpiece. 3,969,822, Cl. 32-27.000.

Fukuyama, Yoshinobu, to Takatori Machinery Works Ltd. Automatic seaming method and long seamer therefor. 3,970,015, Cl. 112-121.120.

Fulkerson, David E., to Honeywell Inc. Logic gate circuits. 3,970,866, Cl. 307-218.000.

Fulmer, Keith H.; Kosarski, Raymond, Jr.; and Hughes, Harold W., to Bendix Corporation, The. Reserve reservoir cover. 3,969,898, Cl. 60-534.000.

Funk, Harald F. Treating waste materials to produce usable gases. 3,970,524, Cl. 201-2.500.

Funk, Larry L., to Funk, Larry L.; and Oliver, James P. Remote light control system. 3,971,028, Cl. 343-225.000.

Furukawa Electric Co., Ltd., The: *See—*
Takizawa, Jun; Oshima, Kazuyuki; Yamamoto, Hikaru; Kuribayashi, Kooji; and Suzuki, Toshio, 3,969,807.

Furukawa, Junji; Kobayashi, Eiichi; and Kawagoe, Takahiro, to Bridgestone Tire Company Limited. Epoxidized acetylene-conjugated diene random copolymer and the curable composition comprising the same. 3,970,608, Cl. 526-19.000.

Furukawa, Tetsuhisa: *See—*
Ogawa, Masaya; and Furukawa, Tetsuhisa, 3,969,785.

Furusaki, Shinichi: *See—*
Nishimura, Kenji; Furusaki, Shinichi; and Hashimoto, Kazuo, 3,970,677.

Futamura, Shingo: *See—*
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G. D. Searle & Co.: *See—*
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Gabriel Industries, Inc.: *See—*
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GAF Corporation: *See—*
Field, Nathan D.; and Williams, Earl P., 3,970,606.

Gahwiler, Hermann: *See—*
Voellmy, Hans Rudolf; and Gahwiler, Hermann, 3,970,097.

Gale, Preston L.; Helton, Eugene L.; and Mueller, Robert C., to Caterpillar Tractor Co. Wear-resistant alloy, and method of making same. 3,970,445, Cl. 75-0.50B.

Gall, Martin, to Upjohn Company, The. 3,5-Disubstituted-4-(α-amino-α-phenyl-o-tolyl)-4H-1,2,4-triazoles. 3,970,666, Cl. 260-308.00R.

Gallagher, Timothy W.: *See—*
Schott, John R.; and Gallagher, Timothy W., 3,970,848.

Gallet, John R.: *See—*
Schmidt, Robert W.; Gallet, John R.; and Czyz, Thomas L., 3,970,489.

Gardineer, Bayard G.; and Panissidi, Hugh A., to International Business Machines Corporation. Self-snubbing miniature piston assembly. 3,969,990, Cl. 92-85.00B.

Gardner-Denver Company: *See—*
Workman, William, Jr., 3,970,151.

Garrett, Roy Peter; and Parkins, Derek Ray, to SKF Trading and Development Co. B.V. Hydraulic release mechanism for clutches. 3,970,177, Cl. 192-91.00A.

Garrigues, Claude; Signouret, Jean Baptiste; and Chambu, Claude, to Societe Nationale des Petroles d'Aquitaine. Sulfur emulsion in bituminous material. 3,970,468, Cl. 106-274.000.

Garruto, Peter G. Teaching aid. 3,969,832, Cl. 35-75.000.

Gasior, Stanley J.; Forney, Albert J.; Haynes, William P.; and Kenny, Richard F., to United States of America, Energy Research and Development Administration. Process for reducing sulfur in coal char. 3,970,434, Cl. 44-1.00F.

Gates, Gerald Alan; and Ryan, William John, to International Business Machines Corporation. Backside laser dicing system. 3,970,819, Cl. 219-121.0LM.

Gateway Machine & Design, Inc.: *See—*
Hawkins, Ernest C., 3,969,965.

Gatton, William R.: *See—*
Widecrantz, Kaj; and Gatton, William R., 3,970,415.

Gaylord, John F., Jr., to Medical Specialties, Inc. Body support binder and method of fabricating same. 3,970,079, Cl. 128-78.000.

Gaynor, Joseph, to Bell & Howell Company. Image transfer layers for infrared transfer processes. 3,970,002, Cl. 101-463.000.

Gazzard, Edward George; and Singer, Michael, to Imperial Chemical Industries Limited. Biocidal compositions. 3,970,755, Cl. 424-270.000.

Gebr. Hofmann KG: *See—*
Himmler, Gunther, 3,969,933.

Gehl Company: *See—*
Martin, Virgil B.; and Villers, Roger L., 3,969,947.

Gehweiler, William Frederick; and Pridgen, Junius Isaac, to United States of America, Navy. High-speed adder. 3,970,833, Cl. 235-175.000.

Geier, Viktor Georgievich; Gruba, Vladimir Ivanovich; Logvinov, Nikolai Grigorievich; Uskov, Evgeny Vasilievich; Kostanda, Viktor Semenovich; and Mirgorodsky, Vladimir Georgievich. Airlift. 3,969,834, Cl. 37-58.000.

Geils, Frederick W.: *See—*
Haselton, Philip H.; and Geils, Frederick W., 3,970,339.

Gema AG Apparatebau: *See—*
Braun, Franz, 3,970,920.

General Electric Company: *See—*
Carroll, James J.; and Mitchell, Graham R., 3,970,810.
Giaever, Ivar, 3,970,518.
Hodgins, Robert G., 3,970,900.
Hodsdon, Roy F.; and Mann, Friedrich H., 3,969,796.
Jeter, Donald Wayne; and Keith, Walter Gill, 3,970,581.
Mees, Robert D.; and Bell, Gordon M., 3,970,723.
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Rist, Donald Hammond; and Turley, Barry Jay, 3,970,858.
Roth, Walter L.; and Farrington, Gregory C., 3,970,473.
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General Foods Corporation: *See—*
Feldman, Jacob Richard; Haas, Gerhard Julius; and Lugay, Joaquin Castro, 3,970,520.
Mitchell, William A.; Stahl, Howard D.; and Seidel, William C., 3,970,766.
Pitchon, Esra; Chall, Steven Barry; and Schulman, Marvin, 3,970,765.

General Instrument Corporation: *See—*
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General Motors Corporation: *See—*
Bernard, James A., 3,970,112.
Carroll, Charles D.; and Meginnis, George B., 3,970,319.
Nelson, Robert E., 3,969,890.
Smale, Charles H.; and Pyne, James A., Jr., 3,970,252.
Stettler, Richard J.; and Verdouw, Albert T., 3,969,892.
Wize, Gary A., 3,969,789.

General Scanning Inc.: *See—*
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General Signal Corporation: *See—*
Auer, John H.; and Smith, Willis R., 3,970,271.
Kleimeyer, Vermon T.; and Schinner, Thomas J., 3,970,826.

General Staple Company, Inc.: *See—*
Zahn, Irwin, 3,969,811.

Gengnagel, Kurt; and Papenfuhs, Theodor, to Hoechst Aktiengesellschaft. Process for the preparation of pure tolutriazoles. 3,970,667, Cl. 260-308.00B.

George, Douglas Franklin; and Yowell, Wayne Lester. Hand tool for holding an elongated member while simultaneously moving a second member axially along the elongated member. 3,969,964, Cl. 81-310.000.

George Hyman Construction Co.: *See—*
Goetjen, Ted G., 3,970,200.

Gerbal, Claude Fernand Marcel, to Eastman Kodak Company. Photographic developing agents. 3,970,454, Cl. 96-29.00D.

Gerber, Heinz Joseph; and Chase, Earle Merritt, to Gerber Scientific Instrument Company, The. Plotting head for consumable marking material. 3,971,036, Cl. 346-139.00C.

Gerber Scientific Instrument Company, The: *See—*
Gerber, Heinz Joseph; and Chase, Earle Merritt, 3,971,036.

Gerbier, Gerard; and Rivault, Jean-Paul, to Saft-Societe des Accumulateurs Fixes et de Traction. Primary cell, in which the positive active material is silver chromate. 3,970,475, Cl. 136-100.00R.

Gerhardt, Lester A.; Corby, Nelson R., Jr.; and Sims, Edward M., to United States of America, Navy. Image processing system. 3,971,068, Cl. 358-82.000.

Gerresheim, Jost: *See—*
Rowe, Wilhelm; and Gerresheim, Jost, 3,970,161.

Gerson, Robert; and Bell, Robert J., to University of Missouri, The Curators of the. Depletion layer laser beam modulator and deflector. 3,970,364, Cl. 350-160.00R.

Geyer, Hans; Rotter, Christoph; and Welsch, Wolfgang, to Siemens Aktiengesellschaft. Liquid crystal cell for a liquid crystal display screen. 3,970,363, Cl. 350-160.0LC.

Giaever, Ivar, to General Electric Company. Magnetic separation of biological particles. 3,970,518, Cl. 195-1.500.

Giaimo, Anthony: *See—*
Coulombe, Lionel J.; and Giaimo, Anthony, 3,970,019.

Giannone, Victor S. Tire chain assembly. 3,970,132, Cl. 152-233.000.

Gibson, Robert R., Jr.; and Kim, Joo I. Method and apparatus for harvesting crops. 3,970,150, Cl. 171-56.000.

Gien, Abraham; and Gien, Bernard Lionel. Pneumatic percussion machines. 3,970,153, Cl. 173-17.000.

Gien, Bernard Lionel: *See—*
Gien, Abraham; and Gien, Bernard Lionel, 3,970,153.

Giglia, Robert Domenico, to American Cyanamid Company. Additives that increase the stability of electrochromic films in electrochromic devices. 3,970,365, Cl. 350-160.00R.

Gildea, Robert. Water lounge. 3,969,776, Cl. 4-172.000.

Gilliam, Edward T.: *See—*
Prevorsek, Dusan Ciril; Kwon, Young Doo; Sharma, Raj Kumar; and Gilliam, Edward T., 3,969,930.

Gilmore, Ralph W. Conveyor-type traffic signal device. 3,970,988, Cl. 340-43.000.

Gimaret, Pierre Louis, to Etablissements Metallurgiques du Val d'Ambv. Method of manufacturing hollow elements from thermoplastic materials. 3,970,736, Cl. 264-310.000.

Ginn, Martin E.; and Liebman, Irwin, to Alberto Culver Company. Heavy duty alkaline liquid surfactant concentrate. 3,970,595, Cl. 252-545.000.

Ginsberg, Guenter: *See—*
Figueroa, David Richard; and Ginsberg, Guenter, 3,970,392.

Giulie, Joe D., to Minnesota Mining and Manufacturing Company. Binder element. 3,970,331, Cl. 281-21.00R.

Givaudan Corporation: *See—*
Ploner, Klaus-Jurgen, 3,970,592.

Gladney, Walter W.: *See—*
Bankes, Robert B.; and Gladney, Walter W., 3,970,471.

Glaenzer, Richard H.: *See—*
Connors, William P.; Glaenzer, Richard H.; Saum, George A.; and Wagner, Robert G., 3,971,057.

Glanemann, Rudolf; and Schlaupitz, Wolfgang, to Vacu-Lift Maschinenbau GmbH. Vacuum lifting unit including a suction cup. 3,970,341, Cl. 294-64.00R.

Glover, Clinton G.; Markley, Jack H.; and Young, Patrick J., to Potlatch Corporation. End trim plywood process. 3,970,497, Cl. 156-182.000.

Gluck, Wolfgang; and Benek, Lothar, to Messrs. Eckart-Werke Standard-Bronzepulver-Werke Carl Eckart. Water-dispersible aluminium pastes. 3,970,577, Cl. 252-182.000.

Goeke, Alfons, to Th. Kieserling & Albrecht. Workpiece feed channel. 3,969,919, Cl. 72-405.000.

Goetjen, Ted G., to George Hyman Construction Co. Gantry. 3,970,200, Cl. 214-1.00H.

Goetzewerke-Friedrich Goetze AG: *See—*
Stecher, Friedhelm; Fazekas, Josef; Johren, Paul; and Morsbach, Martin, 3,970,322.

Golden, John P. Portable X-ray device. 3,970,884, Cl. 313-55.000.

Goldie, Brian Peter Forsyth; Kirkwood, Kenneth Clark; and Lightbody, Alan William, to BP Chemicals International Limited. Polymerization process. 3,970,613, Cl. 526-104.000.

Goldstein, Leon: *See—*
Sokolovsky, Mordechai; Freeman, Amihay; and Goldstein, Leon, 3,970,597.

Goldsworthy Engineering, Inc.: *See—*
Hegyi, Tim T., 3,970,831.

Goodacre, Charles Lindsay, to Fiat Societa per Azioni. Internal combustion engines. 3,970,053, Cl. 123-30.00D.

Goodsmith, Dale H.; and Ladouceur, Harold A., to Multifastener Corporation. Fastener installation head. 3,969,808, Cl. 29-208.00D.

Goodwin, Frank E.; and Graves, Ross E., to Hughes Aircraft Company. Dual channel phase locked optical homodyne receiver. 3,970,838, Cl. 250-199.000.

Goodwin, William D., to Athlon Corporation, The. Nutrient protein from keratinaceous material solubilized with N,N,-dimethylformamide. 3,970,614, Cl. 260-123.700.

Goodyear Aerospace Corporation: *See—*
Kirkhart, Fred P., 3,970,174.

Goodyear Tire & Rubber Company, The: *See—*
Feeney, George W.; and Burroway, Gary L., 3,970,623.
Gregg, Michael J. W., 3,969,946.
Hopper, Roger J., 3,970,133.
Kraft, Louis Seelbach; and Burkley, Thomas E., 3,970,733.
McNenney, William; and Sponseller, John R., 3,970,261.
Schoenberg, Emanuel; and Hanlon, Thomas L., 3,970,724.

Gore, Douglas John. Floating skimmer for cleaning the surface of a body of liquid, method and apparatus. 3,970,556, Cl. 210-83.000.

Goss, Gary J.: *See—*
Daly, Robert M.; Mekota, John E., Jr.; and Goss, Gary J., 3,970,997.

Gossie, Mijo A., to Corning Glass Works. Decal smoothing apparatus. 3,970,508, Cl. 156-477.00R.

Goto, Kenjiro, to Mansei Kogyo Kabushiki Kaisha. Actuating arrangements for a cigarette lighter. 3,970,420, Cl. 431-255.000.

Gouda, Keijiro: *See—*
Motai, Yoichi; Gouda, Keijiro; and Isono, Atsuya, 3,970,028.

Goyer, Andre; and Smadja, Rene, to Mobil Oil Corporation. Anisotropic road surface. 3,970,403, Cl. 404-27.000.

Graf, Felix: *See—*
Bruggisser, Klaus; Graf, Felix; Mandl, Gerhard; and Ruegg, Albert, 3,970,260.

Graf, Robert: *See—*
Hacke, Hans-Jurgen; and Graf, Robert, 3,969,815.

Graham, Joseph A., Jr. Portable animal pen and gate structure. 3,970,045, Cl. 119-20.000.

Granatek, Alphonse Peter: *See—*
Kaplan, Murray Arthur; and Granatek, Alphonse Peter, 3,970,651.

Grannemann, Gerhard: *See—*
Riedel, Dieter; Rathert, Horst; and Grannemann, Gerhard, 3,969,797.

Grasham, James A. Color encoding-decoding method. 3,969,830, Cl. 35-2.000.

Gravereaux, Daniel: *See—*
Kinzie, George R., Jr.; and Gravereaux, Daniel, 3,970,803.

Graves, Ross E.: *See—*
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Grawey, Charles E., to Caterpillar Tractor Co. Belt replacement method for tube tires. 3,970,493, Cl. 156-96.000.

Gray, Don N., to Owens-Illinois, Inc. Amino acid derivatives of chloromethylated polymers and methods of making the same. 3,970,603, Cl. 526-12.000.

Gray, Stephen R.: *See—*
Meyer, Stanley A.; and Gray, Stephen R., 3,970,070.

Graybill, Clinton L. Variable venturi carburetor. 3,970,730, Cl. 261-41.00D.

Green, James E. Method and apparatus for dual resolution analysis of a scene. 3,970,841, Cl. 250-201.000.

Greenbaum, Sheldon B.: *See—*
Horn, Herman; Greenbaum, Sheldon B.; Ely, Charles M.; Hacke, Walter; and Olle, David A., 3,970,648.

Greene, Franklin R., to Howlin Enterprises, Inc. Positioning device for radiation treatment of cervical carcinoma. 3,970,073, Cl. 128-1.200.

Greene, Ralph F.: *See—*
Copeland, Robert L.; Greene, Ralph F.; Beeler, David R.; Eastridge, Robert A.; and Chase, Vance A., 3,970,006.

Greenfield, Howard J.: *See—*
Sindelar, Frank J.; and Greenfield, Howard J., 3,970,075.

Gregg, Michael J. W., to Goodyear Tire & Rubber Company, The. Circular side positive drive belt teeth. 3,969,946, Cl. 74-230.500.

Grieger, Gerhard; and Bohrdt, Joaquin, to Siemens Aktiengesellschaft. Fluid actuating device for an electric circuit breaker. 3,969,985, Cl. 91-416.000.

Griesser, Rolf: *See—*
Bohler, Hans; and Griesser, Rolf, 3,970,649.

Grigg, James H.: *See—*
Bates, Wayne J.; Berenson, Walter L.; Euchner, William H., Jr.; Grigg, James H.; Stern, Morton; and Taylor, Ronald W., 3,970,937.

Grimm, Peter: *See—*
Etzbach, Volker; Forg, Wolfgang; and Grimm, Peter, 3,970,441.

Grinev, Alexei Nikolaevich: *See—*
Shvedov, Vasily Ivanovich; Grinev, Alexei Nikolaevich; and Sytina, Evgenia Nikolaevna, 3,970,707.

Grip, Carl Erik: *See—*
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Grob & Co. Aktiengesellschaft: *See—*
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Grolig, Johann: *See—*
Scharfe, Gerhard; Schwerdtel, Wulf; Swodenk, Wolfgang; Engelhard, Bruno; Grolig, Johann; Martin, Manfred; and Reissinger, Karl-Hermann, 3,970,713.

Grolla, Herbert, to Heinrich Wagner Maschinenfabrik. Apparatus for producing and transferring casting moulds. 3,970,137, Cl. 164-160.000.

Grolla, Herbert, to Heinrich Wagner Maschinenfabrik. Vacuum control valving apparatus for a vacuum sealed molding apparatus. 3,970,139, Cl. 164-253.000.

Grove, Marvin H., to M & J Valve Company. Fluid flow control apparatus and method. 3,969,924, Cl. 73-46.000.

Gruba, Vladimir Ivanovich: *See—*
Geier, Viktor Georgievich; Gruba, Vladimir Ivanovich; Logvinov, Nikolai Grigorievich; Uskov, Evgeny Vasilievich; Kostanda, Viktor Semenovich; and Mirgorodsky, Vladimir Georgievich, 3,969,834.

Grubenmann, Manfred, to Fritz Gegauf Aktiengesellschaft, Bernina-Nahmaschinenfabrik. Switch having hemispherical pivotal cover actuator for movable lever contact member. 3,970,984, Cl. 338-153.000.

Grumman Aerospace Corporation: *See—*
Carson, John C., 3,970,990.

Gryctko, Carl E.; Ball, Kenneth D.; and McGinnis, Peter J., to I-T-E Imperial Corporation. Circuit interrupter having rotary switch operator and interlocking structure with two position mounting plate. 3,970,808, Cl. 200-50.00A.

Gryctko, Carl E., to I-T-E Imperial Corporation. Ground fault circuit breaker with ground fault trip indicator. 3,970,975, Cl. 335-18.000.

Gryschuk, Danny, to Lawrence Peska Associates, Inc., a part interest. Electrical targets irregularly illuminated. 3,970,310, Cl. 273-102.20R.

Grzeslo, Ignacy John. Temperature compensator for gas flow meter. 3,969,939, Cl. 73-194.00M.

GSE, Inc.: *See—*
Shoberg, Ralph S., 3,969,935.

GTE Automatic Electric (Canada) Limited: *See—*
Thomas, Robert M., 3,970,805.

GTE Automatic Electric Laboratories Incorporated: *See—*
Zellmer, Neale A., 3,970,871.

GTE Laboratories Incorporated: *See—*
Buhrer, Carl F., 3,971,005.

GTE Sylvania Incorporated: *See—*
Johnson, David A.; and Towle, William C., 3,970,797.

Guanella, Gustav, to Patelhold Patentverwertungs & Elektro-Holding AG. Method and device for the coded transmission of messages. 3,970,790, Cl. 179-1.50S.

Guest, David Hubert: *See—*
Rigby, Peter Anthony; Hodgson, Ralph; and Guest, David Hubert, 3,970,926.

Gulf Oil Corporation: *See—*
Hurst, Jack; and Anspon, Harry D., 3,970,626.

Gulf Research & Development Company: *See—*
Doyle, William C., Jr., 3,970,652.

Gulotta, Joseph A., to PPG Industries, Inc. Method of introducing protective atmosphere gases into a glass forming chamber. 3,970,442, Cl. 65-32.000.

Gunn, Walter H., to Diamond Shamrock Corporation. Simplified metal treating compositions formed from precursor components. 3,970,482, Cl. 148-6.200.

Guntersdorfer, Max: *See—*
Helmrich, Hans; and Guntersdorfer, Max, 3,970,184.

Gutin, Jury Viktorovich: *See—*
Shamsutdinov, Ural Gilyazitdinovich; Gutin, Jury Viktorovich; and Kupriyanov, Alexandr Sergeevich, 3,970,564.

Guttinger, Urs; and Hofer, Hans, to Motorwagenfabrik Berna AG. Bimetal multiple cylinder for extruders in plastics processing machinery. 3,970,113, Cl. 138-157.000.

Guzman, Angel: *See—*
Crabbe, Pierre; Fried, John H.; and Guzman, Angel, 3,970,684.

Gyurki, Karoly, to Siemens-Albis AG. Time-division-multiplex arrangement. 3,970,796, Cl. 179-15.0AF.

H C Products Co.: *See—*
Markham, Robert D., 3,969,955.

H. K. Porter Company, Inc.: *See—*
Mucka, John R., 3,970,168.

Haag, Darwin O. Sealed storage unit with access. 3,969,997, Cl. 99-646.00S.

Haas, Gerhard Julius: *See—*
Feldman, Jacob Richard; Haas, Gerhard Julius; and Lugay, Joaquin Castro, 3,970,520.

Haberkorn, Axel: *See—*
Aichinger, Gerd; Haberkorn, Axel; Kolling, Heinrich; Kranz, Eckart; and Reisdorff, Josef, 3,970,752.

Habzansky, John: *See—*
Pratt, Robert Eugene; and Habzansky, John, 3,970,570.

Hacke, Hans-Jurgen; and Graf, Robert, to Siemens Aktiengesellschaft. Process for forming a through connection between a pair of circuit patterns disposed on opposite surfaces of a substrate. 3,969,815, Cl. 29-625.000.

Hacke, Walter: *See—*
Horn, Herman; Greenbaum, Sheldon B.; Ely, Charles M.; Hacke, Walter; and Olle, David A., 3,970,648.

Hacker, Charles L. Liquid stopped-flow apparatus. 3,970,388, Cl. 356-72.000.

Hager, Walter, to Pfaff Industriemaschinen GmbH. Work feeding mechanism for sewing machines. 3,970,018, Cl. 112-206.000.

Hahn, Horst, to F. J. Gattys Verfahrenstechnik GmbH, Firma. Dosing device for pneumatic delivery systems. 3,970,159, Cl. 177-123.000.

Halasa, Adel Farhan: *See—*
Kyker, Gary Stephen; Antkowiak, Thomas Anthony; and Halasa, Adel Farhan, 3,970,533.

Halcomb, Walter C.; Eastman, Naomi A.; Eastman, Robert D.; VanMeter, Harvey A.; and Chapman, Russell W. Packaging machine. 3,969,874, Cl. 53-183.000.

Halliburton Company: *See—*
Barrington, Burchus Q.; Farley, David L.; and Morrisett, O. L., 3,969,937.
Jessup, Robert L.; and Coleman, Joe E., 3,970,147.

Hamaguchi, Ichiro; and Toyoda, Kenji, to Nippon Kogaku K.K. Device for checking a D.C. source voltage relative to a predetermined value. 3,970,933, Cl. 324-133.000.

Hamilton, Douglas D., to Logging Development Corporation. Method and apparatus for severing and marking trees. 3,970,124, Cl. 144-3.00D.

Hamlet, Buck C.: *See—*
Sweet, Philip J.; Hamlet, Buck C.; and Sweet, David L., 3,970,293.

Hamma, Noritaka: *See—*
Minai, Masayoshi; Suzuki, Yoshio; Hamma, Noritaka; Murayama, Eiichi; and Aono, Shunji, 3,970,694.

Hammann, Ingeborg: *See—*
Lorenz, Walter; Boshagen, Horst; Hammann, Ingeborg; and Behrenz, Wolfgang, 3,970,665.

Hanai, Ichiro; Kobayashi, Toshiharu; and Takahashi, Kazuo, to Sony Corporation. Thermal printing apparatus. 3,971,069, Cl. 360-16.000.

Hanai, Ichiro; Kobayashi, Toshiharu; and Takahashi, Kazuo, to Sony Corporation. Heating means for heating a magnetic tape above its Curie point prior to duplication by contact with a master tape. 3,971,070, Cl. 360-16.000.

Hanaoka, Akio; and Yoshimochi, Ken, to Sony Corporation. Teaching system. 3,969,831, Cl. 35-8.00A.

Hanlon, Thomas L.: *See—*
Schoenberg, Emanuel; and Hanlon, Thomas L., 3,970,724.

Hans, Waldemar: *See—*
Brune, Gerhard; Staib, Helmut; Kochendorfer, Heinrich; Hans, Waldemar; Ropstorff, Walter; Leiber, Heinz; and Kirstein, Lothar, 3,970,111.

Hansen, Egon Jorgen, to Danfoss A/S. Magnetic valve. 3,970,282, Cl. 251-129.000.

Hansen, James E.; and Schmit, Eugene R., to Cutler-Hammer, Inc. A.C. motor starting system. 3,970,908, Cl. 318-221.00E.

Hanslik, Wilhelm, to Krauss-Maffei Aktiengesellschaft. Transmission for multiscrew extruder. 3,969,956, Cl. 74-665.0GD.

Hansmann, Hermann: *See—*
Mayr, Gert Michael; and Schofl, Wolfgang, 3,970,314.

Hanson, Violet M. Flat bottom bag. 3,970,241, Cl. 229-58.000.

Hardy, Gilbert F. Spring loop key ring and belt attachment. 3,970,227, Cl. 224-5.00R.

Hardy, William Baptist; and Savides, Christos, to American Cyanamid Company. Heat stabilizers for polyvinyl chloride (β-amino-β-arylacrylonitriles). 3,970,622, Cl. 260-23.0XA.

Hardy, William Baptist; and Susi, Peter Vincent, to American Cyanamid Company. Tetramethylpiperidinylphosphine oxides as light stabilizers for polymers. 3,970,636, Cl. 260-45.8NE.

Hardy, William Baptist; and Savides, Christos, to American Cyanamid Company. Heat stabilizers for polyvinyl chloride (β-amino-β-arylacrylamides). 3,970,644, Cl. 260-23.0XA.

Harmony Emitter Company, Inc.: *See—*
Harmony, Richard C., 3,970,251.

Harmony, Richard C., to Harmony Emitter Company, Inc. Pipe insertable emitter for irrigation systems. 3,970,251, Cl. 239-107.000.

Harris Corporation: *See—*
Kozma, Adam, 3,970,358.
Krygeris, Algirdas J.; and Manring, John M., 3,970,393.
Stanton, Arthur J., 3,970,394.

Harris, Jesse, to Reed Tool Company. Collapsible ball valve. 3,970,106, Cl. 137-843.000.

Harris, Jesse W.; Bassinger, Ross; and Bassinger, Grey, to Bassinger Tool Enterprises, Ltd. Mud actuated drilling tool. 3,970,152, Cl. 173-15.000.

Harris, Robert C., to Bendix Corporation, The. Electrical discharge device comprising an insulator body having an electrically semiconducting coating formed thereon. 3,970,591, Cl. 252-521.000.

Harris Trust and Savings Bank, executor: *See—*
McKee, Albert E., deceased, 3,970,103.

Hart, John W.; and Rolfson, Thomas C., to S. C. Johnson & Son, Inc. Aerosol package containing a foam-forming emulsion and propellent system. 3,970,584, Cl. 252-305.000.

Hartless, Ray Lawson; and Trozzolo, Anthony Marion, to Bell Telephone Laboratories, Incorporated. Stabilized polymeric composition and product using same. 3,970,637, Cl. 260-45.9NC.

Hartmann & Braun Aktiengesellschaft: *See—*
Faulhaber, Reimar; Ascherfeld, Margareta; and Fabinski, Walter, 3,970,387.
Moldenhauer, Kurt; and Stolz, Heinrich, 3,970,372.

Hartmann, Rainer: *See—*
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Hartung, Kuhn & Co. GmbH, Firma: *See—*
Bender, Martin; Knappstein, Johannes; and Stratmann, Josef, 3,970,526.
Bender, Martin; Knappstein, Johannes; and Stratmann, Josef, 3,970,526.

Harvey, Horace A., to I-T-E Imperial Corporation. Hot line detection system for high voltage switchgear. 3,970,932, Cl. 324-133.000.

Harvey, Vernon Bryan William, to Wright Rain Limited. Pipe-following irrigation machine. 3,970,102, Cl. 137-344.000.

Harwood, Leopold Albert; and Wittmann, Erwin Johann, to RCA Corporation. Controller gain signal amplifier. 3,970,948, Cl. 330-29.000.

Haselton, Frederick R. Water closet flushing device. 3,969,775, Cl. 4-67.00A.

Haselton, Philip H.; and Geils, Frederick W., to Detex Corporation. Double swinging latchbolt. 3,970,339, Cl. 292-227.000.

Hashimoto, Kazuo: *See—*
Nishimura, Kenji; Furusaki, Shinichi; and Hashimoto, Kazuo, 3,970,677.

Haskell, Theodore Herbert: *See—*
Kee Woo, Peter Wing; and Haskell, Theodore Herbert, 3,970,643.

Hattori, Kenji. Buckle for strapping parcel or the like with tape. 3,969,792, Cl. 24-74.00A.

Hauser, Martin; and Malofsky, Bernard M., to Loctite Corporation. Anaerobic compositions and surface activator therefor. 3,970,505, Cl. 156-331.000.

Hauser, Raimund: *See—*
Von Belvard, Peter Revy, 3,970,368.

Hawkins, Ernest C., to Gateway Machine & Design, Inc. Multiple mold forming machine. 3,969,965, Cl. 82-3.000.

Hawkins, Harold R.: *See—*
Keeling, Boyd E.; and Hawkins, Harold R., 3,970,247.

Hawkins, Luther M. Athletic wrist support. 3,970,305, Cl. 273-54.00B.

Hayasaka, Isao, to Takeda Riken Kogyo Kabushiki Kaisha. Resistor with low temperature coefficient. 3,970,983, Cl. 338-9.000.

Hayashi, Hisao: *See—*
Matsushita, Takeshi; Hayashi, Hisao; and Kawana, Yoshiyuki, 3,971,061.

Hayashi, Takao: *See—*
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Haynes, William P.: *See—*
Gasior, Stanley J.; Forney, Albert J.; Haynes, William P.; and Kenny, Richard F., 3,970,434.

Hayward, Frederick R.; and Larson, L. James, to Avco Corporation. Pyrophoric flare. 3,970,003, Cl. 102-37.800.

Heatshield Research and Development Pty. Ltd.: *See—*
Menzies, John Ian, 3,970,496.

Hechenbleikner, Ingenuin; and Enlow, William Palmer, to Borg-Warner Corporation. 2-Hydroxyethylphosphines. 3,970,532, Cl. 204-158.00R.

Heckman, Jerry A.: *See—*
Reiche, Charles Ronald; and Heckman, Jerry A., 3,970,711.

Heeb, Anton, to Balzers Patent und Beteiligungs AG. Vacuum valve construction. 3,970,281, Cl. 251-77.000.

Heflinger, Lee O.; and Wuerker, Ralph F., to TRW Inc. Multifrequency laser oscillator for holographic contouring. 3,970,390, Cl. 356-109.000.

Hegyi, Tim T., to Goldsworthy Engineering, Inc. Digitizing system for tape placement apparatus. 3,970,831, Cl. 235-151.100.

Heick, Robert Bruce: *See—*
Colton, John Robert; Heick, Robert Bruce; and Mann, Henry, 3,970,799.

Heim Universal Corporation: *See—*
McCloskey, Albert R., 3,969,803.

Hein, Lehmann A.G.: *See—*
Trojan, Gunter; and Bohm, Richard, 3,970,470.

Heindl, Kenneth J., to Briggs & Stratton Corporation. State-of-charge indicator for voltage-regulated battery charger. 3,970,913, Cl. 320-48.000.

Heinemann Electric Company: *See—*
Nicol, Ronald, 3,970,976.

Heinrich Wagner Maschinenfabrik: *See—*
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Helde, Sven Ake: *See—*
Fredriksson, Henning; and Helde, Sven Ake, 3,970,264.

Heller, Laszlo; Forgo, Laszlo; and Bakay, Arpad, to Transelektro Magyar Villamossagi Kulkereskedelmi Vallalat. Air operated underground cooler means with natural lift. 3,970,140, Cl. 165-45.000.

Helm, Leon E. Magnetic light assembly. 3,970,837, Cl. 240-52.150.

Helmrich, Hans; and Guntersdorfer, Max, to Siemens Aktiengesellschaft. Mosaic printing head for typewriters or similar machines. 3,970,184, Cl. 197-1.00R.

Helton, Eugene L.: *See—*
Gale, Preston L.; Helton, Eugene L.; and Mueller, Robert C., 3,970,445.

Hemsath, Klaus H.: *See—*
Schultz, Thomas J.; and Hemsath, Klaus H., 3,970,435.

Henault, Claude; and Cochard, Pierre, to Regie Nationale des Usines Renault; and Automobiles Peugeot. Internal combustion engine fed with a stratified double charge. 3,970,054, Cl. 123-32.0ST.

Henderson, James M. Continuous carpet dyeing process. 3,969,780, Cl. 8-149.100.

Henrick, Clive A.; and Siddall, John B., to Zoecon Corporation. Alkoxy substituted aliphatic di-olefinic halides. 3,970,704, Cl. 260-614.00R.

Henry, Dale Vernon: *See—*
Blust, Henry Leo; Lindburg, Norman Lee; and Henry, Dale Vernon, 3,970,235.

Henry Valve Company: *See—*
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Hentschel, Volkmar, to Braunschweigische Maschinenbauanstalt. Support structure for a suspension centrifuge. 3,970,243, Cl. 233-19.00R.

Henzgen, Detlef: *See—*
Deisinger, Franz; Husges, Gert; Bock, Erich; Niestroj, Heinrich; and Henzgen, Detlef, 3,969,910.

Hepp, Wolfgang; and Wirtzfeld, Alexander, to Dornier System GmbH. Apparatus for heart stimulation. 3,970,076, Cl. 128-24.500.

Herbst, Edward J.; and Peyser, Harry A., to Continental Can Company, Inc. Tooling arrangement for end closure scoring. 3,970,023, Cl. 113-1.00F.

Hermann Rappold & Co. GmbH: *See—*
Uerlichs, Johannes; Muller, Rudolf; and Stolberg, Hermann-Josef, 3,970,109.

Hernandez Gonzalez, Bernabe. Gangway ladder. 3,970,169, Cl. 182-1.000.

Herring, William M.: *See—*
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Herter, Anton: *See—*
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Hewlett-Packard Company: *See—*
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Elward, John S., 3,970,999.
Hornak, Thomas, 3,971,015.

Hewlett-Packard Limited: *See—*
Rigby, Peter Anthony; Hodgson, Ralph; and Guest, David Hubert, 3,970,926.

Heynisch, Hinrich; Meyerer, Paul; and Wolfram, Roland, to Siemens Aktiengesellschaft. Electron collector for an electron beam tube. 3,970,891, Cl. 315-3.500.

Hi-Lo Powered Stirrups, Inc.: *See—*
Robards, David S., 3,970,287.

Hiestand, Armin; and Jager, Horst, to Ciba-Geigy AG. N-heterocyclic perfluoroalkyloarboxylic acid esters, process for their manufacture and their use. 3,970,669, Cl. 260-309.500.

Higuchi, Michio, to Oki Electric Industry Company, Ltd. High-frequency automatic gain control circuit. 3,970,949, Cl. 330-29.000.

Hill, James Dan: *See—*
Warmka, Gary Paul; and Hill, James Dan, 3,970,433.

Hill, Michael, to General Instrument Corporation. Fluxing technique for removing lead oxide. 3,970,239, Cl. 228-220.000.

Hill, Robert A.: *See—*
Peressini, Eugene R.; Hill, Robert A.; and Kallis, James M., 3,970,962.

Himmler, Gunther, to Gebr. Hofmann KG. Spring joint for measuring device. 3,969,933, Cl. 73-133.00R.

Hinata, Masanao: *See—*
Shiba, Keisuke; Hinata, Masanao; Sato, Akira; Ogawa, Akira; and Kato, Hirotetu, 3,970,461.

Hind, Robert Duncan, to United States Steel Corporation. Pouring of molten metals. 3,970,283, Cl. 251-144.000.

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Hinson, David C.: *See—*
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Hirai, Takashi, to Kabushiki Kaisha Hirai Giken. Metal roof construction. 3,969,850, Cl. 52-97.000.

Hirano, Masachika: *See—*
Kitamura, Shigeyoshi; Okuno, Yositosi; and Hirano, Masachika, 3,970,703.

Hirose, Yoshio: *See—*
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Hisey, Thomas Bruce, to Homestead Logs Limited. Prefabricated building log sections. 3,969,859, Cl. 52-233.000.

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Hoadley, Harry W. Two-stage rotary engines. 3,970,050, Cl. 123-8.050.

Hobart Corporation: *See—*
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Hodgins, Robert G., to General Electric Company. Overvoltage protection for an integrated circuit. 3,970,900, Cl. 317-31.000.

Hodgson, Ralph: *See—*
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Hodsdon, Roy F.; and Mann, Friedrich H., to General Electric Company. Releasable fastening arrangement for a radio housing and a battery housing. 3,969,796, Cl. 24-270.000.

Hoechst Aktiengesellschaft: *See—*
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Hofer, Friedrich Karl: *See—*
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Hofer, Gerald: *See—*
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Hofer, Hans: *See—*
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Hoffman, Charles Reeves, to International Business Machines Corporation. Differential amplifier with constant gain. 3,970,951, Cl. 330-30.00D.

Hoffman, Lewis Charles; McMunn, Charles William; Mones, Arthur Harvey; and Short, Oliver Alton, to Du Pont de Nemours, E. I., and Company. Gold conductor compositions. 3,970,590, Cl. 252-514.000.

Hoffman, Philip A. Battery charging circuit. 3,970,912, Cl. 320-2.000.

Hoffmann, Gunter: *See—*
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Hoffmann-La Roche Inc.: *See—*
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Holcomb, Stephen A. Cycle seat with accessory-bearing attachments. 3,970,345, Cl. 297-195.000.

Holland, John Murray, to Imperial Chemical Industries Limited. Storage-stable diisocyanate compositions. 3,970,680, Cl. 260-453.0SP.

Hollandse Signaalapparaten B.V.: *See—*
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Hollingsead-Pryor Enterprises, Inc.: *See—*
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Hollingsead, Robert Allen; and Pryor, Clyde Robert, to Hollingsead-Pryor Enterprises, Inc. Electrical connector and contact strip therefor. 3,970,351, Cl. 339-49.00R.

Hollis, David L.; and Magner, Richard G., to Corning Glass Works. Pulse discriminator circuit. 3,970,845, Cl. 250-214.00R.

Holm, Robert E.; and Schuldt, Paul H., to Diamond Shamrock Corporation. Cycloheximide-cyanobenzene compositions as fruit abscission. 3,970,443, Cl. 71-94.000.

Holman, George B.: *See—*
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Holt, William H.; and Mock, Willis, Jr., to United States of America, Navy. Positron probes for mechanical fatigue detection system. 3,970,855, Cl. 250-493.000.

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Honda, Saburo; Kunitomo, Kyoji; and Nagahara, Yasumori, to Ricoh Co., Ltd. Apparatus for color electrophotography. 3,970,383, Cl. 355-4.000.

Honecker, Gunter; and Knappe, Kurt, to Linde Aktiengesellschaft. Three-stage load-lifting assembly for fork-lift trucks. 3,970,171, Cl. 187-9.00E.

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Hope, Henry F.; and Hope, Stephen F. Liquid level responsive apparatus. 3,969,942, Cl. 73-302.000.

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Hopkins, John Root; Renn, Robert Maurice; and Southard, Robert Keith, to AMP Incorporated. Intrinsic certification assembly technique for wiring components into an electrical apparatus. 3,970,354, Cl. 339-113.00R.

Hopper, Roger J., to Goodyear Tire & Rubber Company, The. Chlorothio-sulfonamide-modified rubbery terpolymers and their blends. 3,970,133, Cl. 152-353.00R.

Horichi, Tetsuya, to Sony Corporation. Signal rectifying circuit. 3,970,870, Cl. 307-261.000.

Horiishi, Nanao: *See*—
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Horn, Alexander. Tape tearing device. 3,970,230, Cl. 225-65.000.

Horn, Charles G., to Aro Manufacturing Co., Inc. Sunroof structure. 3,970,343, Cl. 296-137.00E.

Horn, Herman; Greenbaum, Sheldon B.; Ely, Charles M.; Hacke, Walter; and Olle, David A., to Diamond Shamrock Corporation. 2-[2-(5-Nitro-2-furyl)vinyl]-4-(anilino)quinazolines. 3,970,648, Cl. 260-240.00A.

Horn, Klaus: *See*—
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Horn, Peter; Cordes, Claus; and Pflueger, Richard, to BASF Aktiengesellschaft. Polyhexamethylene adipamide molding compositions not subject to discoloration when conditioned with water. 3,970,634, Cl. 260-45.70S.

Hornak, Thomas, to Hewlett-Packard Company. Recirculating type analog to digital converter. 3,971,015, Cl. 340-347.0AD.

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Hosokawa, Hisashi; and Iijima, Eicho. Electric heater for heating lubricating oils. 3,970,816, Cl. 219-205.000.

Hotten, Bruce W., to Chevron Research Company. Aliphatic sulfurized ester lubricant. 3,970,568, Cl. 252-48.600.

Hou, Shou Ling: *See*—
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Houdaille Industries, Inc.: *See*—
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House, Robert M.: *See*—
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Howard, Shirly Lavar, to International Telephone and Telegraph Corporation. Three dimensional radar system with integrated PPI presentation. 3,971,020, Cl. 343-7.900.

Howat, Eric F., to American Marine Industries, Inc. Foam-filled, cellular structural product. 3,970,324, Cl. 280-610.000.

Howell, Jack M., to Valcor Engineering Corporation. Leak detector. 3,969,923, Cl. 73-40.50R.

Howlin Enterprises, Inc.: *See*—
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Hsiao, James C., to Union Special Corporation. Automatic safety stop mechanism. 3,970,013, Cl. 112-67.000.

Huang, Min-Nan; and Walter, Neil F., to DEC International, Inc. Apparatus for liquid smoke regeneration. 3,969,996, Cl. 99-476.000.

Hudson Lock, Inc.: *See*—
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Hull, R. Dell. Ruggedized closed face spinning reel. 3,970,263, Cl. 242-84.20A.

Humphreys, Rex T.; Medina, Glenn J.; and Parker, Patrick A., to Caterpillar Tractor Co. Temperature-control arrangement for a pair of hydraulic motors. 3,969,897, Cl. 60-456.000.

Hunt, John Owen, to Dowty Rotol Limited. Rotary actuators suitable for bladed rotors. 3,970,410, Cl. 416-154.000.

Hurst, Forrest G.: *See*—
Moss, Robert J.; and Hurst, Forrest G., 3,969,877.

Hurst, Jack; and Anspon, Harry D., to Gulf Oil Corporation. Ethylene interpolymer compositions and process. 3,970,626, Cl. 260-29.6WB.

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Ihde, Frederick J., Jr., to Diamond Shamrock Corporation. Polyvinylchloride compositions for frothing. 3,970,620, Cl. 260-2.50P.

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Ikuta, Hiroshi; and Kato, Takaaki, to Nippondenso Co., Ltd. Electronic taxi fare meter. 3,970,827, Cl. 235-92.0TC.

Iliff, Robert L., to United States of America, Air Force. Controllable ultrafast light shutter. 3,970,967, Cl. 332-7.510.

Imodco, Inc.: *See*—
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Imperial Chemical Industries Limited: *See*—
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Institut Francais du Petrole, es Carburants et Lubrifiants et Entreprise de Recherches et d'Activities Petroliers Elf: *See*—
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Isley, Reggald E. Wood trimming machine. 3,969,967, Cl. 83-435.200.
Isobe, Yasuo; Ito, Tadashi; and Ito, Fumio, to Canon Kabushiki Kaisha. Single lens reflex camera having an electric shutter. 3,971,047, Cl. 354-50.000.
Isono, Atsuya: *See—*
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Ito, Ryuzo: *See—*
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Jackson, William M. Priming means for bow steering pumps. 3,970,027, Cl. 114-151.000.
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Jasinski, Leon, to Motorola, Inc. Method and apparatus for magnetizing permanent magnet in magnetic structure. 3,971,054, Cl. 335-284.000.
Jaskolski, Stanley V.; Lade, Robert W.; Schutten, Herman P.; Spellman, Gordon B.; and Van Horn, Lawrence E., to Cutler-Hammer, Inc. Semiconductor temperature switches. 3,971,056, Cl. 357-28.000.
Javan, Ali, to Massachusetts Institute of Technology. Generating and using coherent optical radiation. 3,970,839, Cl. 250-199.000.
Jeal, Harvey Philip; and Sheffield, David John, to Avdel Limited. Valve for a fluid dispenser. 3,970,225, Cl. 222-529.000.
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Jenny, Christian Jakob, to International Business Machines Corporation. Communication switching system. 3,970,994, Cl. 340-172.500.
Jessup, Robert L.; and Coleman, Joe E., to Halliburton Company. Method and apparatus for annulus pressure responsive circulation and tester valve manipulation. 3,970,147, Cl. 166-250.000.
Jeter, Donald Wayne; and Keith, Walter Gill, to General Electric Company. Multiple gas streams in the post oxidation step in a process for converting uranium hexafluoride to uranium oxide rich compositions. 3,970,581, Cl. 252-301.10R.
Jezl, James L.; and Peters, Edwin F., to Standard Oil Company. Melt finishing process for polymers produced by vapor state polymerization processes. 3,970,611, Cl. 526-65.000.
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Johnson, George B., to United States of America, Navy. Voice controlled disappearing audio delay line. 3,970,791, Cl. 179-1.50S.
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Chesiow, Ernest, 3,970,086.
Johnson, Philip M.; and Northrup, Richard M., to Sanders Associates, Inc. Direction determining method and apparatus. 3,970,391, Cl. 356-152.000.
Johnson & Phillips (Capacitors) Limited: *See—*
Murfitt, John Edward; and Pitt, Alastair Martin, 3,970,904.
Johnson, Sam H., Jr.: *See—*
Snapp, Thomas C., Jr.; Blood, Alden E.; and Johnson, Sam H., Jr., 3,970,619.
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Johren, Paul: *See—*
Stecher, Friedhelm; Fazekas, Josef; Johren, Paul; and Morsbach, Martin, 3,970,322.
Jolles, Georges; and Ponsinet, Gerard, to Rhone-Poulenc S.A. Antibiotic 27,706 RP and salt thereof. 3,970,641, Cl. 536-17.000.
Joly, Jean, to La Telemecanique Electrique. Socket for busbars. 3,970,356, Cl. 339-252.00P.
Jones, Donald F., Sr. Soil agitating device. 3,970,012, Cl. 111-6.000.
Jones, Frederick G.: *See—*
Doser, Manfred; and Jones, Frederick G., 3,970,484.
Jones, Loyd W.; and Holman, George B., to Standard Oil Company. Method for stimulating wells completed in oil bearing earth formations. 3,970,148, Cl. 166-307.000.
Jones, Mervyn Evan: *See—*
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Jones, Robert H.: *See—*
Boswank, Stuart E.; Jones, Robert H.; and Whaley, Newton P., 3,970,098.

Jones, Robert L., to Parker-Hannifin Corporation. Priority valve. 3,970,100, Cl. 137-112.000.

Jonsson, Finn L.; and Adolfsson, Rune G., to AB Carbox. Metal bending press with removable upper beam. 3,969,921, Cl. 72-453.060.

Jordan, William D., to United States of America, Army. Pool cooling infrared telescope. 3,970,850, Cl. 250-352.000.

Jordan, William D., to United States of America, Army. Spray cooling for infrared telescope. 3,970,851, Cl. 250-352.000.

Jorgensen, Paul J.: *See—*
Anbar, Michael; McMillen, Donald F.; Weaver, Robert D.; and Jorgensen, Paul J., 3,970,474.

Joseph, Lancelot, to Lawrence Peska Associates, Inc., a part interest. Boxing toy. 3,969,841, Cl. 46-268.000.

Journee, Paul. Pression sector windscreen-wiper blade for motor vehicles. 3,969,784, Cl. 15-250.420.

Judd, Edward J.: *See—*
Dalton, Brian L.; and Judd, Edward J., 3,970,781.

Judge, John S.: *See—*
Smith, Donald O.; and Judge, John S., 3,970,887.

Julia, Marc, to Agence Nationale de Valorisation de la Recherche (ANVAR). Process for synthesizing cis-α-santalene and cis-α-santalol. 3,970,706, Cl. 260-617.00F.

Jung, Hans Wolf; Maul, Rudolf; and Wehner, Hermann Wolfgang, to Ciba-Geigy Corporation. Process for the production of organotin halides in sulphones as reaction medium. 3,970,679, Cl. 260-429.700.

Jurva, Edsel O., to Medtronic, Inc. Venting of electrochemical cell. 3,970,478, Cl. 136-133.000.

Kabat, Richard W.: *See—*
Lievens, Ronald J.; and Kabat, Richard W., 3,969,805.

Kabushiki Kaisha Daini Seikosha: *See—*
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Kabushiki Kaisha Hirai Giken: *See—*
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Kabushiki Kaisha Kajitekkosho: *See—*
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Kabushiki Kaisha Suncrux Research Office: *See—*
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Kachel, Volker, to Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V. Electrical apparatus for the calibration of equipment used in the measurement of particle volume. 3,970,928, Cl. 324-71.0CP.

Kaesgen, Juergen, to MTD Products Inc. Engine mounting. 3,970,272, Cl. 248-9.000.

Kaibara, Nobuhiro; and Nishizawa, Kazuro, to Diesel Kiki Co., Ltd. Fuel injection pump control system. 3,970,065, Cl. 123-140.0CC.

Kaiwa, Yataro; and Saito, Hiroshi, to Japan Servo Co., Ltd. Apparatus for chopping light beam. 3,970,371, Cl. 350-273.000.

Kallis, James M.: *See—*
Peressini, Eugene R.; Hill, Robert A.; and Kallis, James M., 3,970,962.

Kaneko, Ryutaro; and Kaneko, Yoshio. Apparatus for forming ring-shaped foodstuffs. 3,969,994, Cl. 99-450.600.

Kaneko, Yoshio: *See—*
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Kanning, L. Neil: *See—*
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Kano, Masafumi: *See—*
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Kano, Saburo; Nomura, Osami; Asada, Mitsuo; Ando, Meiki; Matsuda, Michihiko; Yamada, Tomio; Watanabe, Hitoshi; and Taniguchi, Takuzo, to Nippon Soda Company Limited. Certain thiazolotriazolyphosphonothioates used as insecticides. 3,970,751, Cl. 424-200.000.

Kansai Paint Company, Ltd.: *See—*
Kondo, Taizo; Matsui, Komaharu; and Yamamoto, Kunio, 3,970,621.

Kanzaki Paper Manufacturing Co., Ltd.: *See—*
Kondo, Mitsuru; Miyake, Makoto; and Iwasaki, Hiroshi, 3,970,671.

Kaplan, Murray Arthur; and Granatek, Alphonse Peter, to Bristol-Myers Company. Crystalline cephalosporin derivative. 3,970,651, Cl. 260-243.00C.

Karasima, Hisanori: *See—*
Ohno, Jiro; Iuchi, Tohru; Tokita, Yasuo; Karasima, Hisanori; Watanabe, Kunitoshi; and Murashima, Seiichhiro, 3,969,943.

Karl M. Reich Maschinenfabrik GmbH: *See—*
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Karlsson, Frans Harry, to Hykon-Patent Aktiebolag. Flushing and refilling apparatus. 3,969,774, Cl. 4-41.000.

Karnofsky, George B., to Dravo Corporation. Process for preparing a protein concentrate with minimal protein denaturation. 3,970,764, Cl. 426-430.000.

Kasima, Osamu, to Nippondenso Co., Ltd. Ignition plug for internal combustion engines. 3,970,885, Cl. 313-141.000.

Katayama, Shizuo: *See—*
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Kato, Hajime; and Hayashi, Takao, to Fuji Photo Film Co., Ltd. Recording sheet and method for the production thereof. 3,970,769, Cl. 427-145.000.

Kato, Hirotetu: *See—*
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Kato, Takaaki: *See—*
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Katsumoto, Kiyoshi, to Chevron Research Company. Process for removing aluminum phenoxide catalyst from phenol alkylation products. 3,970,708, Cl. 260-624.00C.

Katsuta, Kihei, to Mitsubishi Jukogyo Kabushiki Kaisha. Heat insulation lined tank for low temperature liquids and methods of manufacturing the same. 3,970,210, Cl. 220-9.0LG.

Kaufman, John Wilson, to AMP Incorporated. Locking clip. 3,970,353, Cl. 339-75.0MP.

Kawada, Tsutomu; Sakai, Kunio; and Mori, Kenichi, to Tokyo Shibaura Electric Co., Ltd. Character recognition system. 3,970,991, Cl. 340-146.3AC.

Kawagoe, Takahiro: *See—*
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Kawai, Susumu, to Minolta Camera Kabushiki Kaisha. Lens barrel for photographic cameras. 3,970,370, Cl. 350-255.000.

Kawaki, Takao: *See—*
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Kawamoto, Tamio; and Ii, Mitugu, to Nissan Motor Co., Ltd. Synchronous ring in a synchronous device. 3,970,294, Cl. 267-161.000.

Kawana, Yoshiyuki: *See—*
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Kawano, Mak S., to American Tara Corporation. High speed carbonizing machine. 3,970,039, Cl. 118-60.000.

Kawasaki, Masahiro, to Asahi Kogaku Kogyo Kabushiki Kaisha. Circuitry for controlling shutter time in accordance with a manually adjustable resistor. 3,970,874, Cl. 307-293.000.

Kawasaki, Yukio: *See—*
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Kawecki Berylco Industries, Inc.: *See—*
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Kayabakoyo-Kabushiki-Kaisha: *See—*
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Kearney, Robert L.; and Sather, Eugene, to Bell & Howell Company. Microfilm recorder document transport system. 3,970,385, Cl. 355-50.000.

Kebabian, Paul L.: *See—*
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Kee Woo, Peter Wing; and Haskell, Theodore Herbert, to Parke, Davis & Company. 5''-Amino-3',5''-dideoxybutirosin A and derivatives. 3,970,643, Cl. 536-17.000.

Keeling, Boyd E.; and Hawkins, Harold R. Conservation of energy heater. 3,970,247, Cl. 237-12.30B.

Keen, Everett M.: *See—*
Peppler, William S.; Keen, Everett M.; and Siciliano, Anthony J., 3,970,044.

Keenan, Bernard J., Jr., to Sun Oil Company of Pennsylvania. Sonic cleaning of wells. 3,970,146, Cl. 166-249.000.

Keene, Harold J., to Stowell Industries Inc. Bottle gripper. 3,970,201, Cl. 214-1.0BT.

Keith, Walter Gill: *See—*
Jeter, Donald Wayne; and Keith, Walter Gill, 3,970,581.

Keller, Anthony Francis; and Marvin, Dennis Fisher, to Motorola, Inc. Crystal oscillator temperature compensating circuit. 3,970,966, Cl. 331-116.00R.

Keller, Donald A., to VSI Recreational Products. Flashlight and flashlight holder. 3,970,228, Cl. 224-5.00H.

Keller, John T.: *See—*
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Kemp, John E. G.: *See—*
Cross, Peter E.; Dickinson, Roger P.; and Kemp, John E. G., 3,970,757.

Kenk, Erhard; and Kenk, Theo, to Aktiengesellschaft Gebruder Loepfe. Device for monitoring the yarn travel in the shuttle of a shuttle loom. 3,970,115, Cl. 139-371.000.

Kenk, Theo: *See—*
Kenk, Erhard; and Kenk, Theo, 3,970,115.

Kennedy, James D.: *See—*
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Kenny, Richard F.: *See—*
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Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung: *See—*
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Kersten, Ralf; Mahlein, Hans; and Oberbacher, Rudolf, to Siemens Aktiengesellschaft. Wave-guide structure with a multi-layer system and methods for producing same. 3,970,360, Cl. 350-96.0WG.

Khan, Hamid Iqbal: *See—*
Connelly, William; Khan, Hamid Iqbal; and McEwan, Ian Hugh, 3,970,628.

Kiehl, William C.; Moore, Thomas F.; and Teague, Jimmie C., to Rockwell International Corporation. Multiple coin parking meter. 3,970,182, Cl. 194-84.000.

Kienscherf, Eckhard, to Licentia Patent-Verwaltungs-G.m.b.H. Circuit arrangement for producing an alternating voltage. 3,970,916, Cl. 321-27.00R.

Kim, Chang K.: *See*—
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Kim, Joo I.: *See*—
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Kimball International, Inc.: *See*—
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King-Koral, Inc.: *See*—
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King, Wendell L., to Medtronic, Inc. Electrochemical cell. 3,970,479, Cl. 136-133.000.

Kinoshita, Keijiro, to Nissan Motor Co., Ltd. Automotive vehicle drive. 3,970,163, Cl. 180-65.00A.

Kinuhata, Koji; Amano, Kitsutaro; Sasaki, Hiroshi; Yamamoto, Hideo; Shibata, Kosho; and Yamada, Kazuo, to Kokusai Denshin Denwa Kabushiki Kaisha. System for converting the number of lines of a television signal. 3,970,776, Cl. 178-6.800.

Kinzie, George R., Jr.; and Gravereaux, Daniel, to CBS Inc. Printed sound track system. 3,970,803, Cl. 179-100.30B.

Kircher, Morton S., to Olin Corporation. Apparatus for depositing fibrous diaphragms. 3,970,041, Cl. 118-428.000.

Kiritani, Masataka: *See*—
Matsukawa, Hiroharu; Katayama, Shizuo; and Kiritani, Masataka, 3,970,585.

Kirk, Colin John, to Martonair Limited. Piston position sensing device. 3,970,034, Cl. 116-124.00D.

Kirkhart, Fred P., to Goodyear Aerospace Corporation. Low wear disk brake assembly. 3,970,174, Cl. 188-251.00A.

Kirkman, Thomas E. Rotary engine device. 3,970,051, Cl. 123-8.090.

Kirkwood, Kenneth Clark: *See*—
Goldie, Brian Peter Forsyth; Kirkwood, Kenneth Clark; and Lightbody, Alan William, 3,970,613.

Kirschner, Thomas Francis, to RCA Corporation. Apparatus for inhibiting a plurality of disc records from being disposed on a turntable and grounding a disc record disposed on the turntable. 3,970,317, Cl. 274-105.000.

Kirstein, Lothar: *See*—
Brune, Gerhard; Staib, Helmut; Kochendorfer, Heinrich; Hans, Waldemar; Ropstorff, Walter; Leiber, Heinz; and Kirstein, Lothar, 3,970,111.

Kishikawa, Hiroshi; Adachi, Takayoshi; and Usami, Tamio, to Sumitomo Chemical Company, Limited; and Japanese National Railways. Element and method for detecting leakage of petroleum products. 3,970,863, Cl. 307-116.000.

Kishino, Shigeo; Kudamatsu, Akio; Sumi, Shozo; and Shiokawa, Kozo, to Bayer Aktiengesellschaft. O-Aryl-alkoxyethyl-thiolphosphoric acid ester. 3,970,728, Cl. 260-949.000.

Kishiwada, Susumu: *See*—
Shiraishi, Tatsuo; Kishiwada, Susumu; Shimizu, Shinkichi; Honmaru, Shigern; Ichihashi, Hiroshi; and Nagaoka, Yoshihiko, 3,970,702.

Kitamura, Shigeyoshi; Okuno, Yositosi; and Hirano, Masachika, to Sumitomo Chemical Company, Limited. Phenylacetic acid derivatives. 3,970,703, Cl. 260-611.00A.

Kitamura, Yoshinori: *See*—
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Kito, Katsumi: *See*—
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Kiyama, Shoji: *See*—
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Klar, Paul Gerhard. Machine for making bag-like two-compartment packages particularly tea bags. 3,969,873, Cl. 53-134.000.

Klaus, Michael Josef: *See*—
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Kleeberger, Rudolf: *See*—
Mayr, Theodor; Buchta, Siegfried; Kleeberger, Rudolf; and Bauer, Otto, 3,970,063.

Kleimeyer, Vermon T.; and Schinner, Thomas J., to General Signal Corporation. Electro-mechanical card reader head. 3,970,826, Cl. 235-61.11C.

Klein, Albert M., to International Telephone and Telegraph Corporation. System for precision time measurement. 3,970,828, Cl. 235-92.00T.

Klein, Joseph R., to United States of America, Air Force. Salvage switch. 3,970,007, Cl. 102-70.20P.

Kletschka, Harold D.: *See*—
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Kline, John E.: *See*—
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Sheetz, George A., 3,970,268.

Klink, Arthur E.: *See*—
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Elion, Glenn R.; and Klink, Arthur E., 3,970,659.

Klisch, Stephen Cajetan; and Martin, Charles Andrew, to Colgate-Palmolive Company. Non-gelling alpha-olefin sulfonate liquid detergent. 3,970,596, Cl. 252-546.000.

Klockner-Humboldt-Deutz Aktiengesellschaft: *See*—
Bongert, Wilhelm, 3,970,552.

Knapp, Siegbert, to Licentia Patent-Verwaltungs-G.m.b.H. Method and apparatus for demodulating PSK modulated oscillations. 3,970,945, Cl. 329-104.000.

Knappe, Kurt: *See*—
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Knappstein, Johannes: *See*—
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Knoll, Frank S.: *See*—
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Kobayashi, Shoichi: *See*—
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Kochendorfer, Heinrich: *See*—
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Kockum Industries, Inc.: *See*—
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Kohlberg, Ulrich, to Saab-Scania Aktiebolag. Orientation of cant for translatory feed through edging cutters. 3,970,128, Cl. 144-245.00A.

Kohler, Robert D.: *See*—
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Kojima, Hiroo: *See*—
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Kokusai Denshin Denwa Kabushiki Kaisha: *See*—
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Kolb, William A.; and Sigh, Jack F., to United States Steel Corporation. Method of refining an iron base melt. 3,970,446, Cl. 75-60.000.

Kolling, Heinrich: *See*—
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Kolm, Eric A., to Signal Science, Inc. Acoustical switch. 3,970,987, Cl. 340-15.000.

Komatsubara, Masahiro, to Pioneer Electronic Corporation. Braking device for three-motor type tape recorder. 3,970,906, Cl. 318-7.000.

Komine, Yoshio: *See*—
Ashida, Akira; Ishikawa, Kazuo; Takahashi, Kiyoshi; Komine, Yoshio; and Hosoe, Kazuya, 3,970,380.

Komusin, Bruce: *See*—
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Kondo, Kiyosi; Matsumoto, Masakatsu; and Mori, Fumio, to Sagami Chemical Research Center. Process for preparing bicyclic γ-lactone. 3,970,673, Cl. 260-343.30R.

Kondo, Mitsuru; Miyake, Makoto; and Iwasaki, Hiroshi, to Kanzaki Paper Manufacturing Co., Ltd. Chromogenic compounds and method for preparation thereof. 3,970,671, Cl. 260-335.000.

Kondo, Taizo; Matsui, Komaharu; and Yamamoto, Kunio, to Kansai Paint Company, Ltd. Powder coating composition for electrodeposition. 3,970,621, Cl. 260-18.0EP.

Koninklijke Emballage Industrie Van Leer B.V.: *See*—
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Konishi, Akihiko: *See*—
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Konrath, Karl: *See*—
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Kooi, Else, to U.S. Philips Corporation. Methods of producing a semiconductor device and a semiconductor device produced by said method. 3,970,486, Cl. 148-187.000.

Kopatz, William H.; Cooper, Rey W.; and Watson, Russell W., to W. R. Grace & Co. Method and apparatus for stitching string to foam used in tampons. 3,970,022, Cl. 112-265.000.

Kopke, Wilfried; and Hoffmann, Gunter, to Volkswagenwerk Aktiengesellschaft. Safety belt winding device. 3,970,265, Cl. 242-107.40A.

Korowitz, Simon, to Sperry Rand Corporation. Bi-directional translator. 3,971,014, Cl. 340-347.0DD.

Kosaraki, Raymond, Jr.: *See*—
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Koshiba, Masao: *See*—
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Koski, Jerry V.: *See*—
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Kosonocky, Walter Frank, to RCA Corporation. Charge coupled device imager. 3,971,003, Cl. 340-173.00R.

Kostanda, Viktor Semenovich: *See*—
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Kouklik, Ivo, to Elitex, Zavody textilniho strojirenstvi generalni reditelstvi. Patterning memory for circular knitting machine. 3,969,912, Cl. 66-154.00A.

Kovats, Lawrence H. G., to Mayfran Incorporated. Roller chain conveyor belt. 3,970,190, Cl. 198-189.000.

Kozma, Adam, to Harris Corporation. Coherent, quasi-monochromatic light source. 3,970,358, Cl. 350-3.500.

Kraft, Louis Seelbach; and Burkley, Thomas E., to Goodyear Tire & Rubber Company, The. Method of making an encapsulated chain. 3,970,733, Cl. 264-135.000.

Kraftco Corporation: *See*—
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Kranz, Eckart: *See*—
Aichinger, Gerd; Haberkorn, Axel; Kolling, Heinrich; Kranz, Eckart; and Reisdorff, Josef, 3,970,752.

Krauss-Maffei Aktiengesellschaft: *See*—
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Kravitz, Howard S.: *See*—
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Krebs, Peter, to I-T-E Imperial Corporation. Nozzle and contact arrangement for puffer type interrupter. 3,970,811, Cl. 200-148.00A.

Krengel, Kenneth W.: *See*—
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Kresse, Suzanne. Display figure. 3,969,837, Cl. 40-126.00R.

Kretschmer, Paul, to Ymos-Mettalwerke. Fastening arrangement for decorative wheel trim. 3,970,346, Cl. 301-37.00R.

Krimmel, Eberhard: *See*—
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Krin, Rene: *See*—
Dachicourt, Augustin; and Krin, Rene, 3,970,292.

Krings, Josef. Self-supporting sheeting panel for trenches or the like. 3,969,852, Cl. 52-155.000.

Krischer, Lawrence A.: *See*—
Wieland, Howard N., Jr.; and Krischer, Lawrence A., 3,970,815.

Krizman, John. Power control valve attachment for two cycle motorcycle type engine exhaust systems. 3,969,895, Cl. 60-312.000.

Krol, Harry J., to King-Koral, Inc. Heavy duty staple. 3,969,975, Cl. 85-49.000.

Krueger, Grant Edward; and Leitner, Richard John, to Kraftco Corporation. Apparatus for making large sized blocks of cheese. 3,969,995, Cl. 99-458.000.

Krygeris, Algirdas J.; and Manring, John M., to Harris Corporation. Automatic compensation for densitometer imbalance. 3,970,393, Cl. 356-195.000.

Kubicek, Louis A., to Burr-Ban Tool Service Company. Tool holder with misalignment compensating means. 3,970,406, Cl. 408-127.000.

Kudamatsu, Akio: *See*—
Kishino, Shigeo; Kudamatsu, Akio; Sumi, Shozo; and Shiokawa, Kozo, 3,970,728.

Kuhl, David E.; and Edwards, Roy Q., to United States of America, Energy Research and Development Administration. Transverse section radionuclide scanning system. 3,970,853, Cl. 250-363.00S.

Kuhn, Klaus Roland; and Stigler, Viktor, to Siemens Aktiengesellschaft. Circuit for generating a trigger blanking voltage for use in analysis of the ignition voltage waveform of an internal combustion engine. 3,970,872, Cl. 307-265.000.

Kuki, Michio: *See*—
Shigeyasu, Motoo; and Kuki, Michio, 3,970,696.

Kulick, Andrew: *See*—
Attridge, Russell G., Jr.; and Kulick, Andrew, 3,970,246.

Kulig, Frank M.; Semrow, Robert A.; and Yorgensen, Harry P., Jr., to J. M. Ney Company, The. Composite dowel pin for dental models. 3,969,820, Cl. 32-11.000.

Kulite Semiconductor Products, Inc.: *See*—
Kurtz, Anthony D.; Mallon, Joseph R.; Brosh, Amnon; and Bice, James William, 3,970,982.

Kullman, Russell M. H.; and Reinhardt, Robert M., to United States of America, Agriculture. Durable press treatment by addition of sodium dihydrogen phosphate to aluminum sulfate catalyst. 3,970,424, Cl. 8-185.000.

Kumon, Osamu, to Sumitomo Electric Industries, Ltd. Piezoelectric acoustic device. 3,970,879, Cl. 310-9.100.

Kunioka, Kazuo: *See*—
Yamada, Takeo; Kunioka, Kazuo; and Teramoto, Toyokazu, 3,970,291.

Kunitomo, Kyoji: *See*—
Honda, Saburo; Kunitomo, Kyoji; and Nagahara, Yasumori, 3,970,383.

Kunz, Paul. Venting valve for a steam decorticator. 3,970,280, Cl. 251-58.000.

Kupriyanov, Alexandr Sergeevich: *See*—
Shamsutdinov, Ural Gilyazitdinovich; Gutin, Jury Viktorovich; and Kupriyanov, Alexandr Sergeevich, 3,970,564.

Kureha Kagaku Kogyo Kabushiki Kaisha: *See*—
Suzuki, Shigeyuki; Yamauchi, Akira; Kiyama, Shoji; and Yamaki, Kiyoshi, 3,970,690.

Yoshida, Masafumi; Murayama, Naohiro; and Obara, Hiroshi, 3,969,927.

Kurek, John A. Atmospheric effects still. 3,970,525, Cl. 202-174.000.

Kuribayashi, Kooji: *See*—
Takizawa, Jun; Oshima, Kazuyuki; Yamamoto, Hikaru; Kuribayashi, Kooji; and Suzuki, Toshio, 3,969,807.

Kurihara, Haruki: *See*—
Nagakura, Akira; Akutagawa, Susumu; and Kurihara, Haruki, 3,970,593.

Kurtz, Anthony D.; Mallon, Joseph R.; Brosh, Amnon; and Bice, James William, to Kulite Semiconductor Products, Inc. Beam type transducers employing accurate, integral force limiting. 3,970,982, Cl. 338-4.000.

Kuss, Robert. Building construction and method. 3,969,862, Cl. 52-404.000.

Kwan, Okum; and Ottersen, William A., to Bunker Ramo Corporation. Magnetic patch arrangement apparatus. 3,970,506, Cl. 156-351.000.

Kwon, Young Doo: *See*—
Prevorsek, Dusan Ciril; Kwon, Young Doo; Sharma, Raj Kumar; and Gilliam, Edward T., 3,969,930.

Kyker, Gary Stephen; Antkowiak, Thomas Anthony; and Halasa, Adel Farhan, to Firestone Tire & Rubber Company, The. Process for conversion of elastomeric phosphazene. 3,970,533, Cl. 204-159.140.

Kyne, Peter John, to P.J.K. Projects Limited. Sheet assemblies and sheets therefor. 3,969,866, Cl. 52-588.000.

La Telemecanique Electrique: *See*—
Joly, Jean, 3,970,356.
Langree, Michel, 3,970,978.

LaCross, George D., to Continental Can Company, Inc. Non-removable tab connection. 3,970,211, Cl. 220-267.000.

Ladbrooke, Peter Howard; Torlesse, Arthur Timothy; and Newman, John David, to Plessey Handel und Investments A.G. Method and apparatus including a sensing head with a pair of strip transmission lines for detecting metallic objects. 3,970,927, Cl. 324-67.000.

Lade, Robert W.: *See*—
Jaskolski, Stanley V.; Lade, Robert W.; Schutten, Herman P.; Spellman, Gordon B.; and Van Horn, Lawrence E., 3,971,056.

Ladouceur, Harold A.: *See*—
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Pouch, Thomas M.; and Ladouceur, Harold A., 3,969,809.

Lake Chemical Company: *See*—
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Laliberte, Norman U., to American Optical Corporation. Process of producing polarizing optical devices and product thereof. 3,970,362, Cl. 350-155.000.

Lamb, Glentworth, to American Cyanamid Company. Fungitoxic compositions containing 2,2'-dihydroxydinaphthylmethane. 3,970,760, Cl. 424-346.000.

Lamberti, Vincent, to Lever Brothers Company. Sulfosuccinate derivatives as detergent builders. 3,970,653, Cl. 260-247.10E.

Lanagan, John B.; and Tilson, Stephen H., to New Folding System Incorporated, The. Apparatus and method for holding one end of a sheet to be folded. 3,970,226, Cl. 223-37.000.

Lang, Francis Harold, to International Nickel Company, Inc., The. Ferritic steel welding material. 3,970,447, Cl. 75-124.000.

Langree, Michel, to La Telemecanique Electrique. Electromagnet. 3,970,978, Cl. 335-203.000.

Lannert, Kent P., to Monsanto Company. Hydroxy ether carboxylates. 3,970,698, Cl. 260-535.00P.

Lanning, Charles T. Power tester for outboard drive assemblies. 3,969,931, Cl. 73-117.100.

Lardenois, Robert A., to Etablissements Lardenois. Apparatus for treatment and care of the hair. 3,970,093, Cl. 132-9.000.

Larson, L. James: *See*—
Hayward, Frederick R.; and Larson, L. James, 3,970,003.

Laskin, Allen I.: *See*—
Zaborsky, Oskar R.; and Laskin, Allen I., 3,970,521.

Lauer, Joseph Robert: *See*—
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Laufer, Helmut: *See*—
Eheim, Franz; Hofer, Gerald; Konrath, Karl; and Laufer, Helmut, 3,970,064.

Lavering, Gordon R., to Varian Associates. Arc lamp with movable electrode. 3,970,883, Cl. 313-39.000.

Lawless, John F.; Ohrin, Leonard J.; and Emery, William M. Artificial snow making method. 3,969,908, Cl. 62-74.000.

Lawrence Peska Associates, Inc.: *See*—
Christie, Donald M., 3,970,308.
Culbertson, William E.; and Culbertson, Linda R., 3,970,217.
Gryschuk, Danny, 3,970,310.
Joseph, Lancelot, 3,969,841.
Levering, Richard M., 3,970,303.
Luchuk, George, 3,970,409.
Taft, Kenneth E., 3,970,340.
Wirsig, Ralph, 3,970,325.

Lawton, Ernest L.; and Ringwald, Eugene L., to Monsanto Company. Fire retardant polyester fibers. 3,970,635, Cl. 260-45.80R.

Lazzaro, Frank, to United States of America, Air Force. Impedance standard apparatus. 3,970,973, Cl. 333-97.00R.

Leaper, Rodney Seymour: *See*—
Cannell, John Corjeag; Leaper, Rodney Seymour; and Parratt, Noel James, 3,970,136.

Lear Siegler, Inc.: *See*—
De Bruine, Carl, 3,970,840.

Leblanc, Destin A.: *See—*
Leblanc, Robert Bruce; and Leblanc, Destin A., 3,970,425.

Leblanc, Robert Bruce; and Leblanc, Destin A., to Cotton Incorporated. Flame retardant process for textile materials including phosphorus, halogen and antimony oxide. 3,970,425, Cl. 8-195.000.

Ledex, Inc.: *See—*
Coors, George T., 3,970,981.

Ledl, Hanne-Lore, to Optische Werke G. Rodenstock. Device for testing color vision. 3,970,376, Cl. 351-35.000.

Lee, Henry L., Jr.; and Orlowski, Jan A. Orthodontic bracket. 3,969,821, Cl. 32-14.00A.

Lee, Hwalin: *See—*
Pallos, Ferenc M.; Lee, Hwalin; and Menn, Julius J., 3,970,758.

Lee, Kai Sing. Frying grease reclaimer. 3,970,558, Cl. 210-138.000.

Lee, Lester A. Gas dynamic-transfer chemical laser. 3,970,955, Cl. 331-94.50G.

Lee, Wing J. Cap selecting and feeding mechanism. 3,970,218, Cl. 221-157.000.

Leehan, Gerald William, to International Business Machines Corporation. LSI chip compensator for process parameter variations. 3,970,875, Cl. 307-304.000.

Legge, Earl N. Method and apparatus for securing a bicycle on a bicycle rack. 3,970,196, Cl. 211-5.000.

Lehmann, Conrad Roland. Three-dimensional network. 3,970,301, Cl. 272-113.000.

Lehmer, Merle E., Jr.: *See—*
Profitt, Leslie M.; and Lehmer, Merle E., Jr., 3,970,793.

Lehtinen, Antti, to Valmet Oy. Steam supplying structure for opposing build-up of matter in headboxes. 3,970,513, Cl. 162-272.000.

Lehureau, Jean Claude: *See—*
Bricot, Claude; and Lehureau, Jean Claude, 3,971,002.

Leiber, Heinz: *See—*
Brune, Gerhard; Staib, Helmut; Kochendorfer, Heinrich; Hans, Waldemar; Ropstorff, Walter; Leiber, Heinz; and Kirstein, Lothar, 3,970,111.

Leight, Howard S. Hard hat ear protector. 3,970,082, Cl. 128-152.000.

Leitner, Richard John: *See—*
Krueger, Grant Edward; and Leitner, Richard John, 3,969,995.

Lejdegard, Sixten H., to Bulten-Kanthal Aktiebolag. Configuration for nuts and bolt heads. 3,969,974, Cl. 85-45.000.

Lemelson, Jerome H. System for scanning information recorded on a plurality of magazine contained filmstrips. 3,970,775, Cl. 178-6.800.

Lemke, Timothy Allen: *See—*
Swengel, Robert Charles, Sr.; Lemke, Timothy Allen; and Villiard, Frederick Phillip, 3,969,816.

Lendi, Ulrich, to Mageba S.A. Movable platform for parking one vehicle above another. 3,969,855, Cl. 52-177.000.

Lenz, Karl-Ludwig, to Siemens Aktiengesellschaft. Phased-array antenna employing an electrically controlled lens. 3,971,022, Cl. 343-754.000.

Les Cables de Lyon: *See—*
Sirel, Michel; and Taille, Francois, 3,970,969.

Le Salver, Robert; and Poupard, Dominique, to Automobiles Peugeot; and Regie Nationale des Usines Renault. Device for suspending the body and the engine-drive unit in an automobile vehicle. 3,970,162, Cl. 180-64.00R.

Leuschner, Horst, to Texas Instruments Incorporated. Synchronous counter/divider using only four NAND or NOR gates per bit. 3,970,867, Cl. 307-225.00R.

Leuschner, Horst, to Texas Instruments Incorporated. Fast programmable divider with a new 5-gate flip-flop. 3,970,941, Cl. 328-41.000.

Leuschner, Horst, to Texas Instruments Incorporated. TTL coupling transistor. 3,971,060, Cl. 357-51.000.

Lever Brothers Company: *See—*
Lamberti, Vincent, 3,970,653.
Moran, David Patrick Joseph; and Pennings, Henricus Jacobus, 3,970,763.

Levering, Richard M., to Lawrence Peska Associates, Inc., a part interest. Game and toy apparatus. 3,970,303, Cl. 273-1.00R.

Levine, Arnold M., to International Telephone and Telegraph Corporation. Airport ground surveiliance system with aircraft taxi control feature. 3,971,025, Cl. 343-108.00R.

Levitt, Barry N.: *See—*
Chapman, Everett E.; Crocker, Thomas H.; and Levitt, Barry N., 3,970,943.

Levitt, Leo L.: *See—*
Bernotus, Donald E.; and Levitt, Leo L., 3,969,918.

Lewis, Donald Joseph, to Allied Chemical Corporation. Inflatable band restraint stitching. 3,970,329, Cl. 280-733.000.

Lewis, Sheldon N.: *See—*
Miller, John J.; Baus, Richard E.; and Lewis, Sheldon N., 3,970,633.

Liang, Victor K. C.: *See—*
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Libbey-Owens-Ford Company: *See—*
Swift, Howard R.; and Livingston, Kenneth C., 3,969,970.

Licentia Patent-Verwaltungs-G.m.b.H.: *See—*
Kienscherf, Eckhard, 3,970,916.
Knapp, Siegbert, 3,970,945.
Merkle, Rolf, 3,971,062.

Lieberman, Martin: *See—*
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Liebman, Clarence J.: *See—*
Voight, John E.; Bovier, Edward M.; and Liebman, Clarence J., 3,970,467.

Liebman, Irwin: *See—*
Ginn, Martin E.; and Liebman, Irwin, 3,970,595.

Lievens, Ronald J.; and Kabat, Richard W., to Trane Company, The. Method of constructing an axial flow fan. 3,969,805, Cl. 29-156.80R.

Lightbody, Alan William: *See—*
Goldie, Brian Peter Forsyth; Kirkwood, Kenneth Clark; and Lightbody, Alan William, 3,970,613.

Lignell, James L.: *See—*
Schofield, George L., Jr.; and Lignell, James L., 3,970,846.

Limburg, William W.; and Seanor, Donald A. Copolymers of N-vinylcarbazole and N-vinylphthalimide and derivatives thereof. 3,970,602, Cl. 260-78.410.

Linatex Corporation of America: *See—*
Ennis, Robert E.; and Derrick, Robert G., 3,970,549.

Lindburg, Norman Lee: *See—*
Blust, Henry Leo; Lindburg, Norman Lee; and Henry, Dale Vernon, 3,970,235.

Linde Aktiengesellschaft: *See—*
Etzbach, Volker; Forg, Wolfgang; and Grimm, Peter, 3,970,441.
Honecker, Gunter; and Knappe, Kurt, 3,970,171.

Linder, Ernst: *See—*
Rieger, Franz; Linder, Ernst; and Schmidt, Peter Jurgen, 3,969,932.

Lindner, Henry; and Kennedy, James D., to Beatrice Foods Company. Portable reflector device. 3,970,033, Cl. 116-63.00P.

Lindsay, James E. Inflation valve gauge. 3,969,936, Cl. 73-146.800.

Linssen, Henricus Wilhelmus Maria, to U.S. Philips Corporation. Plural beam cathode ray tube including an astigmatic electron lens and self-converging. 3,970,890, Cl. 313-413.000.

Litt, Kenneth C.; and Siegel, William J., to Pace, Incorporated. Vacuum desoldering device for soldering irons. 3,970,234, Cl. 228-20.000.

Liu, Chain T.; and Inouye, Henry, to United States of America, Energy Research and Development Administration. Modified iridium-tungsten alloy. 3,970,450, Cl. 75-172.00R.

Livemore, Gerald Sydney Victor. Gas producer arrangements. 3,970,436, Cl. 48-76.000.

Livenick, Corwin E.: *See—*
Deutschmann, William B.; Livenick, Corwin E.; Paulsen, Robert W.; Tyler, Len A.; and Rose, Clifford L., 3,970,880.

Livesay, Eugene F.: *See—*
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Livingston, Kenneth C.: *See—*
Swift, Howard R.; and Livingston, Kenneth C., 3,969,970.

Lochman, Lubomir; Rodova, Miroslava; and Trekoval, Jiri, to Ceskoslovenska akademie ved. Method for preparation of polymethacrylates by the anionic polymerization. 3,970,609, Cl. 526-89.000.

Loctite Corporation: *See—*
Hauser, Martin; and Malofsky, Bernard M., 3,970,505.

Lodi, Robert J., to Sperry Rand Corporation. Reprogrammable read only variable threshold transistor memory with isolated addressing buffer. 3,971,001, Cl. 340-173.00R.

Loew, Gunther: *See—*
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Loew, Peter: *See—*
Dengler, Siegfried; Loew, Peter; Zickendraht, Christian; and Schwander, Hansrudolf, 3,970,675.

Loew, Theodore, to Standard Products Company, The. Method of making trim strip end finishes. 3,970,498, Cl. 156-211.000.

Logging Development Corporation: *See—*
Hamilton, Douglas D., 3,970,124.

Logvinov, Nikolai Grigorievich: *See—*
Geier, Viktor Georgievich; Gruba, Vladimir Ivanovich; Logvinov, Nikolai Grigorievich; Uskov, Evgeny Vasilievich; Kostanda, Viktor Semenovich; and Mirgorodsky, Vladimir Georgievich, 3,969,834.

Lohr, Raymond J. Impact gun with pellet positioning lever. 3,970,311, Cl. 273-101.000.

Loiacono, Vincent R., to Physio Medics, Inc. Catheter. 3,970,090, Cl. 128-349.00R.

Lonati, Francesco, to Costruzioni Meccaniche Lonati di Lonati Francesco & Figli (Ettore, Faust, Tiberio) S.n.c. Toe closer. 3,969,911, Cl. 66-95.000.

Long, Kenneth: *See—*
Chatham, Cyril Gordon; and Long, Kenneth, 3,970,224.

Long, Otto V. Uniflow-type external combustion engine featuring double expansion and rotary drive. 3,970,055, Cl. 123-43.00A.

Longinotti, Enrico, to Longinotti S.p.A. Material metering units. 3,970,223, Cl. 222-306.000.

Longinotti S.p.A.: *See—*
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Lonn, Harold J., to Henry Valve Company. Ball valve assembly. 3,970,285, Cl. 251-214.000.

Lord Corporation: *See—*
Owston, William J., 3,970,709.

Lorenz, Walter; Boshagen, Horst; Hammann, Ingeborg; and Behrenz, Wolfgang, to Bayer Aktiengesellschaft. Benzisoxazolo (thiono)phosphoric(phosphonic)acid esters. 3,970,665, Cl. 260-307.0DA.

Louis, Joseph E., to Sundstrand Corporation. Transmission ratio control system. 3,969,896, Cl. 60-431.000.

Louis Marx & Co., Inc.: *See—*
Palumbo, Nunzio J., 3,970,399.

Lowther, Frank Eugene, to W. R. Grace & Co. Ozonizer with absorption of ozone. 3,970,567, Cl. 250-533.000.

Lubeck, Donald. Tubular structures. 3,970,401, Cl. 403-265.000.

Lucas, Joseph G., to Avco Corporation. Apparatus for electrochemical milling of turbine blade edges. 3,970,538, Cl. 204-224.00M.

Luce, David A.: *See—*
Clark, Melville, Jr.; and Luce, David A., 3,969,968.
Clark, Melville, Jr.; and Luce, David A., 3,969,969.

Lucey, George K., Jr.: *See—*
Clark, Samuel A., Jr.; Lucey, George K., Jr.; and Zimmerman, Thomas H., 3,971,024.

Luchuk, George, to Lawrence Peska Associates, Inc., a part interest. Wind power and flywheel apparatus. 3,970,409, Cl. 416-145.000.

Lugay, Joaquin Castro: *See—*
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Luis Mestre Development Corporation: *See—*
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Lukas, Helmut H., to Northern Electric Company Limited. Loading coil case and cable connection for communications cables. 3,970,783, Cl. 178-46.000.

Lutts, Carlton G.: *See—*
Babson, Edward S.; Brett, Oliver C., Jr.; Cavicchi, Warren A.; and Lutts, Carlton G., 3,970,017.

Lutz, Karl Treasure, to Caterpillar Tractor Co. Skewed roller conveyor. 3,970,204, Cl. 214-339.000.

M.A.T. Industries, Inc.: *See—*
Amoroso, Michael J., 3,969,961.

M & J Valve Company: *See—*
Grove, Marvin H., 3,969,924.

M & T Chemicals Inc.: *See—*
Sukman, Edwin L.; and Touval, Irving, 3,970,598.

MacDonald, George James; and Bartley, Bryan Allen. Apparatus for reducing the size of discrete material. 3,970,257, Cl. 241-275.000.

MacGregor-Comarain, Inc.: *See—*
Burton, Grady, 3,970,026.

MacInnes, Hugh; and Uitti, Paul M., to Rajay Industries, Inc. Bearing housing assembly method for high speed rotating shafts. 3,969,804, Cl. 29-156.40R.

MacKenzie, James A. Constructional element. 3,969,867, Cl. 52-633.000.

Mador, Irving L.: *See—*
Scheben, John A.; Hinnenkamp, James A.; and Mador, Irving L., 3,970,697.

Maeda, Hiroaki: *See—*
Miyao, Takayuki; Maeda, Hiroaki; Sato, Masanori; and Sakai, Toshimitsu, 3,969,958.

Maeda, Kozo; and Date, Masakazu, to Toyo Boseki Kabushiki Kaisha. Method of improvement in coloring glass fabrics. 3,970,422, Cl. 8-8.000.

Maekawa, Takehiko: *See—*
Nakada, Masahiko; and Maekawa, Takehiko, 3,970,062.

Mageba S.A.: *See—*
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Mages, Bernhard: *See—*
Rock, Erich; and Mages, Bernhard, 3,969,787.

Magner, Richard G.: *See—*
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Mahaffey, James W.; and Ziegler, Charles J., to Cavitron Corporation. Ultraviolet light applicator. 3,970,856, Cl. 250-493.000.

Mahl, Gunard O. B., to CHA Industries. Wire fed flash evaporation source. 3,970,820, Cl. 219-271.000.

Mahlein, Hans: *See—*
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Maida, Osamu, to Nippon Kogaku K.K. Electromagnetic trigger device for use with camera capable of automatic time exposure. 3,971,053, Cl. 354-234.000.

Maillefer, Charles; and Schlaeppi, René, to Maillefer S.A. Machine for manufacturing cables by stranding individual wires. 3,969,880, Cl. 57-6.000.

Maillefer S.A.: *See—*
Maillefer, Charles; and Schlaeppi, Rene, 3,969,880.

Makinsky, Ismail Zulfugarovich; and Baksht, Samuil Petrovich. Falling film evaporator. 3,970,512, Cl. 159-13.00R.

Makita, Tomoo: *See—*
Takano, Rikuo; Sumitomo, Yuji; Yamamoto, Yoichi; Makita, Tomoo; and Aiba, Masahiko, 3,971,039.

Mallon, Joseph R.: *See—*
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Mallory, Robert A.; and Settepani, Joseph A., to Ortho Pharmaceutical Corporation. Halo-steroidal thioketals. 3,970,646, Cl. 260-239.55D.

Malofsky, Bernard M.: *See—*
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Mandl, Gerhard: *See—*
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Manghisi, Elso; Salimbeni, Aldo; and Mennella, Pietro, to Istituto Luso Farmaco d'Italia S.r.l. 2,2 Disubstituted-benzodioxoles. 3,970,672, Cl. 260-340.500.

Mann, Friedrich H.: *See—*
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Mann, Henry: *See—*
Colton, John Robert; Heick, Robert Bruce; and Mann, Henry, 3,970,799.

Manring, John M.: *See—*
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Mansei Kogyo Kabushiki Kaisha: *See—*
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Mantelet, Jean, to Moulinex, Societe Anonyme. Mincing machine. 3,970,258, Cl. 241-282.100.

Mantey, Paul-Gerhard: *See—*
Brotzmann, Karl; Fassbinder, Hans Georg; Hofer, Friedrich Karl; and Mantey, Paul-Gerhard, 3,970,444.

Manthei, David H.: *See—*
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Marcantonio, Livio F.: *See—*
Schaedler, Raymond J.; and Marcantonio, Livio F., 3,970,110.

Marchetti, Peter B.: *See—*
Comstock, Donald W.; and Marchetti, Peter B., 3,969,991.

Marino, Francis C., to Redactron Corporation. Vertical deflection circuit. 3,970,896, Cl. 315-387.000.

Markham, Robert D., to H C Products Co. Press brake safety device. 3,969,955, Cl. 74-613.000.

Markley, Jack H.: *See—*
Glover, Clinton G.; Markley, Jack H.; and Young, Patrick J., 3,970,497.

Marquette Metal Products Company: *See—*
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Marra, Dorothea C.: *See—*
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Marsan Manufacturing Company, Inc.: *See—*
Mersan, Elayne R., 3,970,085.

Marschak, Howard J. Display rack. 3,970,199, Cl. 211-128.000.

Marsden, Ronald Eric; Webb, Franklyn Walter; and Rukavina, George, to Stricon Products Limited. Splicer for reinforcing bars. 3,969,920, Cl. 72-415.000.

Marsh, Paul G., to Black Clawson Fibreclaim, Inc. Method for separating glass from heat resistant materials. 3,970,254, Cl. 241-1.000.

Martin, Charles Andrew: *See—*
Klisch, Stephen Cajetan; and Martin, Charles Andrew, 3,970,596.

Martin, Gilbert Marius Henri: *See—*
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Martin, John: *See—*
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Martin, Manfred: *See—*
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Martin, Patrick J.: *See—*
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Martin, Reynold W.: *See—*
Banks, Jon F.; Livesay, Eugene F.; and Martin, Reynold W., 3,970,091.

Martin, Sylvia, to Oxy Metal Industries Corporation. Electropolishing aluminum and aluminum alloys. 3,970,529, Cl. 204-129.900.

Martin, Virgil B.; and Villers, Roger L., to Gehl Company. Tapered tooth sprocket. 3,969,947, Cl. 74-243.00R.

Martonair Limited: *See—*
Kirk, Colin John, 3,970,034.

Marukawa, Hiromasa: *See—*
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Maruzen Oil Co. Ltd.: *See—*
Fujiwara, Hiroshi; Asano, Koichi; Sugishita, Akio; and Takahashi, Asao, 3,970,534.

Marvel, Carl Shipp; and Verborgt, Jozef, to University Patents, Inc. Nitrile terminated aromatic polyethers. 3,970,681, Cl. 260-465.00F.

Marvin, Dennis Fisher: *See—*
Keller, Anthony Francis; and Marvin, Dennis Fisher, 3,970,966.

Maskery, Arthur, to Westinghouse Brake & Signal Co. Ltd. Electrical control system for pneumatic brakes. 3,970,348, Cl. 303-22.00R.

Maslowski, Bohdan; and Tzanos, Dimitri, to Battelle Memorial Institute. Method of and system for the destruction and/or limitation of the reproduction of micro-organisms in nutritive media. 3,970,530, Cl. 426-237.000.

Mason, Charles F., to Esterline Corporation. Chart recorder using a fixed thermal print head. 3,971,041, Cl. 346-76.00R.

Massachusetts Institute of Technology: *See—*
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Searle, Campbell L., 3,970,787.

Masuda, Koji: *See—*
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Mathes, Larry W. Archer's bow square for locating arrow nocking point position. 3,969,825, Cl. 33-180.00R.

Matsuda, Michihiko: *See—*
Kano, Saburo; Nomura, Osami; Asada, Mitsuo; Ando, Meiki; Matsuda, Michihiko; Yamada, Tomio; Watanabe, Hitoshi; and Taniguchi, Takuzo, 3,970,751.

Matsuda, Motonobu: *See—*
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Matsuda, Yoshindo: *See—*
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Matsudaira, Tadashi; and Mishina, Yoshihiro, to Ishikawajima-Harima Jukogyo Kabushiki Kaisha. Floating breakwaters. 3,969,901, Cl. 61-5.000.

Matsui, Goro; Toda, Koji; Horiishi, Nanao; Wakimoto, Kazuyoshi; Nishiyama, Yoshifumi; Taketa, Tsuneyoshi; and Takama, Kazushi, to Toda Kogyo Corporation. Process for producing iron oxide products from waste liquids containing ferrous salts. 3,970,738, Cl. 423-140.000.

Matsui, Komaharu: *See—*
Kondo, Taizo; Matsui, Komaharu; and Yamamoto, Kunio, 3,970,621.

Matsukawa, Hiroharu; Katayama, Shizuo; and Kiritani, Masataka, to Fuji Photo Film Co., Ltd. Process for preparing oil-containing microcapsules. 3,970,585, Cl. 252-316.000.

Matsumoto, Masakatsu: *See—*
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Matsuo, Yoshio, to Nippon Electric Company, Ltd. Demodulator for amplitude-and-phase modulated signals having control means for reducing phase and amplitude errors. 3,970,946, Cl. 329-104.000.

Matsushita Electric Industrial Co., Ltd.: *See—*
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Yasuda, Tooru; Kitamura, Yoshinori; and Nakabe, Ryuhei, 3,970,894.

Matsushita, Takeshi; Hayashi, Hisao; and Kawana, Yoshiyuki, to Sony Corporation. Semiconductor device with a high breakdown voltage characteristic. 3,971,061, Cl. 357-52.000.

Matsuyama Petrochemicals Inc.: *See—*
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Matthews, Russell B., to Johnson Service Company. Control arrangement fail-safe timing circuit. 3,970,864, Cl. 307-141.000.

Mattson, William F., to B. F. Goodrich Company, The. Reinforced membrane. 3,970,416, Cl. 425-52.000.

Matusch, Siegfried, to Braunschweigische Maschinenbauanstalt. Extraction tower. 3,970,469, Cl. 127-5.000.

Maul, Rudolf: *See—*
Jung, Hans Wolf; Maul, Rudolf; and Wehner, Hermann Wolfgang, 3,970,679.

Maurer, Werner, to Karl M. Reich Maschinenfabrik GmbH. Arresting device for impact drive tools. 3,969,988, Cl. 92-19.000.

Maurer, Werner; and Skuthan, Erich, to Karl M. Reich Maschinenfabrik GmbH. Impact buffer for impact drive tools. 3,969,989, Cl. 92-85.00R.

Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V.: *See—*
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Maxwell, William H., to Cargo Graphics Corporation. Thermograph with removable cartridge. 3,971,035, Cl. 346-33.0TP.

May, Everette Lee, to United States of America, United States. 1-Alkyl-4-m-hydroxyphenyl-4-propionyl piperidines. 3,970,656, Cl. 260-293.800.

Mayer, Hans Johann; Fischli, Albert Eduard; Klaus, Michael Josef; and Wick, Alexander Eduard, to Hoffmann-La Roche Inc. Certain hexahydro-2-loweralkoxy-5-oxycyclopenta [b] furans containing an olefinic substituent in the 4-position. 3,970,674, Cl. 260-346.20R.

Mayer, Robert, to Sun Oil Company of Pennsylvania. Anti-hunting system for valve operator circuit. 3,970,942, Cl. 328-133.000.

Mayfran Incorporated: *See—*
Kovats, Lawrence H. G., 3,970,190.

Mayo-Wells, John F.: *See—*
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Mayr, Gert Michael; and Schofl, Wolfgang, to Hansmann, Hermann. Interengaging rings puzzle. 3,970,314, Cl. 273-156.000.

Mayr, Theodor; Buchta, Siegfried; Kleeberger, Rudolf; and Bauer, Otto, to Robert Bosch G.m.b.H. Fuel injection system. 3,970,063, Cl. 123-139.0AW.

Maytham, Walter J., to Speed Systems, Inc. Cable insulation stripping tool. 3,969,818, Cl. 30-90.100.

McBain, William Lander, to Mitchell-Bate Company, The. Clamping device for use in electroplating. 3,970,540, Cl. 204-297.00W.

McBean, Rupert John Sidney, to Charcon Tunnels Limited. Tunnelling shields. 3,969,906, Cl. 61-85.000.

McCarthy, Bernard: *See—*
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McCaughey, William S., to Bunker Ramo Corporation. Apparatus and method for crimping terminals. 3,969,806, Cl. 29-203.0DS.

McCloskey, Albert R., to Heim Universal Corporation. Method of manufacturing spherical bearing. 3,969,803, Cl. 29-149.50C.

McCollum, Samuel C., to Sangamo Electric Company. Demand controller. 3,970,861, Cl. 307-35.000.

McCullough, Richard C. Door lock hinge. 3,969,788, Cl. 16-144.000.

McEwan, Ian Hugh: *See—*
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McFee, Richard. Exercise stair device. 3,970,302, Cl. 272-130.000.

McGinnis, Peter J.: *See—*
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McGinniss, Vincent Daniel, to SCM Corporation. Photopolymerization process utilizing a 2-methyl-substituted benzimidazole as a photosensitizer. 3,970,535, Cl. 204-159.180.

McGraw-Edison Company: *See—*
Schmidt, Jacob E., 3,970,480.
Steffensen, John, 3,970,472.

McGurty, James A.; and Scherbner, Paul J., to Kawecki Berylco Industries, Inc. Heat treatable nickel-base alloys. 3,970,449, Cl. 75-170.000.

McIntosh, Herbert A., to Texaco Inc. Production of lubricating oils. 3,970,543, Cl. 208-86.000.

McKee, Albert E., deceased (Harris Trust and Savings Bank, executor), to Oxequip Health Industries Inc. Retractable gas line connecting apparatus. 3,970,103, Cl. 137-357.000.

McKee, Clyde M.; and Scott, Ward. Mirror actuator. 3,969,952, Cl. 74-501.00M.

McLaren, Edwin C.; and Schneider, Howard R., to Hoerner Waldorf Corporation. Dispensing package for moistened tissues. 3,970,215, Cl. 221-45.000.

McMillen, Donald F.: *See—*
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McMunn, Charles William: *See—*
Hoffman, Lewis Charles; McMunn, Charles William; Mones, Arthur Harvey; and Short, Oliver Alton, 3,970,590.

McNenney, William; and Sponseller, John R., to Goodyear Tire & Rubber Company, The. Handling tire making materials. 3,970,261, Cl. 242-55.000.

McQuiston, Charles R.: *See—*
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Mead Corporation, The: *See—*
Duffield, Peter Leonard, 3,970,222.
Parsonage, Harry N., 3,970,457.

Meadows, James L.; Smith, Donald H.; Ellington, Gordon H.; Mitchell, William O.; and Frost, W. Wade, to Oxford Industries, Inc. Method of fabricating shirt cuffs. 3,970,021, Cl. 112-262.000.

Meagher, Thomas; and Michatek, Robert J., to Xerox Corporation. Method and apparatus for xerographic reproduction. 3,970,381, Cl. 355-3.00R.

Mecanaids Limited: *See—*
Richards, Derek John, 3,969,778.

Mecca, Sebastian B., to Schuylkill Chemical Company. Aluminum chlorhydroxy glycinate complexes. 3,970,748, Cl. 424-68.000.

Mecca, Sebastian B., to Schuylkill Chemical Company. Medicinal or cosmetic composition containing allantoin glycinate. 3,970,756, Cl. 424-273.000.

Medical Specialties, Inc.: *See—*
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Medicus, Gustav K.: *See—*
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Medina, Glenn J.: *See—*
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Medtronic, Inc.: *See—*
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King, Wendell L., 3,970,479.

Mees, Robert D.; and Bell, Gordon M., to General Electric Company. Impregnating and encapsulating composition for use with type transformers and transformers containing such composition. 3,970,723, Cl. 260-880.00R.

Meginnis, George B.: *See—*
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Meijerink, Hermanus Martinus, to Hollandse Signaalapparaten B.V. Transmission system. 3,970,784, Cl. 178-58.00A.

Meister, Stefan: *See—*
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Mekota, John E., Jr.: *See—*
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Melchior, John G.: *See—*
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Melki, Georges: *See—*
Askienazy, Alexandre; Melki, Georges; and Stevenin, Jean, 3,970,762.

Melton, Vernon L. Welding machine. 3,970,232, Cl. 228-7.000.

Melvin, William W. Composite situation analyzer and instrument flight system. 3,970,829, Cl. 235-150.220.

Mendrin, Michael J.; and Taylor, Richard H. Variable frequency interferometer. 3,970,389, Cl. 356-106.00R.

Menn, Julius J.: *See—*
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Menn, Walter A.: *See—*
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Mennella, Pietro: *See—*
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Menschik, Alfred. Prosthetic knee joint for attachment to a natural or prosthetic leg. 3,969,773, Cl. 3-1.911.

Menzies, John Ian, to Heatshield Research and Development Pty. Ltd. Manufacture of laminates of sheet metal, polythene and aluminium foil. 3,970,496, Cl. 156-162.000.

Merck & Co., Inc.: *See—*
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Elion, Glenn R.; and Klink, Arthur E., 3,970,659.
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Merkle, Rolf, to Licentia Patent-Verwaltungs-G.m.b.H. Semiconductor arrangement. 3,971,062, Cl. 357-70.000.

Mersan, Elayne R., to Marsan Manufacturing Company, Inc. Ostomy appliances and sealing elements. 3,970,085, Cl. 128-283.000.

Messrs. Eckart-Werke Standard-Bronzepulver-Werke Carl Eckart: *See—*
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Meteor AG: *See—*
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Metzger, Herman U. Parts washer. 3,970,560, Cl. 210-167.000.
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Meyerer, Paul: *See—*
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Meyers, Theodore F., to Hobart Corporation. Pulsating torque apparatus and method. 3,970,907, Cl. 318-207.00C.
Michael, Peter Colin; and Stalley, Anthony Donald, to Quantel Limited. Digital time base corrector oscillators. 3,971,063, Cl. 358-8.000.
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Micro-Bit Corporation: *See—*
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Midland-Ross Corporation: *See—*
Decker, Maurice S.; and Downey, George T., 3,970,104.
Schultz, Thomas J.; and Hemsath, Klaus H., 3,970,435.
Milbourn, Edward Marshall, to RCA Corporation. Video de-peaking circuit in luminance channel in response to AGC signal. 3,971,064, Cl. 358-38.000.
Miller, John J.; Baus, Richard E.; and Lewis, Sheldon N., to Rohm and Haas Company. Thermosetting powder coatings composition. 3,970,633, Cl. 260-42.290.
Miller, Russell A.; and Schmidgall, Earl R. Surface heater and dryer. 3,970,071, Cl. 126-271.100.
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Minai, Kiichi: *See—*
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Minai, Masayoshi; Suzuki, Yoshio; Hamma, Noritaka; Murayama, Eiichi; and Aono, Shunji, to Sumitomo Chemical Company, Limited. Cycloalkyl phenoxy carboxylic acid derivatives. 3,970,694, Cl. 260-520.00C.
Minakuchi, Hiroshi, to Matsushita Electric Industrial Co., Ltd. Constant speed regulator for DC motor. 3,970,909, Cl. 318-341.000.
Minetti, Richard Henry; and Strickland, Robert Walter, to Bell Telephone Laboratories, Incorporated; and Western Electric Company. Method and apparatus for removal of semiconductor chips from hybrid circuits. 3,969,813, Cl. 29-575.000.
Minnesota Mining and Manufacturing Company: *See—*
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Mitchell, Graham R., to General Electric Company. Electric circuit breaker comprising parallel-connected vacuum interrupters. 3,970,809, Cl. 200-144.00B.
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Mitchell, William A.; Stahl, Howard D.; and Seidel, William C., to General Foods Corporation. Fixed volatile flavors and method for making same. 3,970,766, Cl. 426-534.000.
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Miyamoto, Akio; and Saeki, Keiso, to Fuji Photo Film Co., Ltd. Process for separating a number of sheets into groups. 3,970,501, Cl. 156-305.000.
Miyao, Takayuki; Maeda, Hiroaki; Sato, Masanori; and Sakai, Toshimitsu, to Aisin Seiki Kabushiki Kaisha; and Jidosha Kogyo Kabushiki Kaisha. Output split type hydrostatic transmission. 3,969,958, Cl. 74-687.000.
Mizuhara, Albert, to United States of America, Navy. Broadband output circuit for klystron amplifier. 3,970,952, Cl. 330-45.000.
Mizusawa, Mitsutoyo, to Nisshin Kogyo Kabushiki Kaisha. Fluid pressure control device with a failure alarm for a vehicle brake system. 3,970,347, Cl. 303-6.00C.
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Moldenhauer, Kurt; and Stolz, Heinrich, to Hartmann & Braun Aktiengesellschaft. Motor driven light chopper. 3,970,372, Cl. 350-274.000.
Mollenauer, Linn Frederick, to Bell Telephone Laboratories, Incorporated. Broadly tunable continuous-wave laser using color centers. 3,970,960, Cl. 331-94.50F.
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Montemayor, Ernest A. Ancestral educational game apparatus. 3,970,313, Cl. 273-134.0AD.
Moore, Charles T., to Dayton-Hudson Corporation. Sign. 3,969,838, Cl. 40-140.000.
Moore, Lawrence A., to Beloit Corporation. Blow moulding method. 3,970,421, Cl. 432-11.000.
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Moran, David Patrick Joseph; and Pennings, Henricus Jacobus, to Lever Brothers Company. Heat pasteurized cake batter. 3,970,763, Cl. 426-324.000.
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Moraw, Roland; Schadlich, Gunther; and Horn, Klaus, to Hoechst Aktiengesellschaft. Apparatus for holographic recording. 3,970,357, Cl. 350-3.500.

Morganeier, Herman C. Fruit picking technique. 3,969,878, Cl. 56-328.00R.

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Mori, Kenichi: *See—*
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Morokawa, Shigeru; Nishimura, Katsuo; and Nomura, Yasushi, to Citizen Watch Co., Ltd. Display device employing special-purpose monograms. 3,971,012, Cl. 340-336.000.

Morooka, Shigeaki: *See—*
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Morrice, Anthony Ronald Seaton, to Hudswell Morrice Ltd. Method of laying a pipeline in a trench. 3,969,904, Cl. 61-106.000.

Morris, Kenneth B. Variable compression ratio control system for internal combustion engines. 3,970,056, Cl. 123-48.00D.

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Motai, Yoichi; Gouda, Keijiro; and Isono, Atsuya, to Nippon Oil Company Ltd.; and Miwa Shokai Company, Ltd. Vessel mooring system. 3,970,028, Cl. 114-230.000.

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Motorwagenfabrik Berna AG: *See—*
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Motozawa, Saburo; Itoga, Hiroyoshi; Wada, Hirobumi; and Marukawa, Hiromasa, to Tokyo Denki Kagaku Kogyo Kabushiki Kaisha (TDK Electronics Co., Ltd.). Aggregation treatment apparatus for waste water. 3,970,562, Cl. 210-205.000.

Moulinex, Societe Anonyme: *See—*
Mantelet, Jean, 3,970,258.

Mourier, Georges, to Thomson-CSF. Parasitic wave attenuator useable in high frequency electronic tubes. 3,970,971, Cl. 333-81.00R.

Mowbray, Dorian Farrar, to C.A.V. Limited. Liquid fuel injection pumping apparatus. 3,970,414, Cl. 417-252.000.

MTD Products Inc.: *See—*
Kaesgen, Juergen, 3,970,272.
Nofel, Thomas J., 3,969,875.
Turos, William E., 3,969,876.

Mucka, John R., to H. K. Porter Company, Inc. Muffler. 3,970,168, Cl. 181-60.000.

Mueller, James M.: *See—*
Ross, Danny E.; and Mueller, James M., 3,970,801.

Mueller, Robert C.: *See—*
Gale, Preston L.; Helton, Eugene L.; and Mueller, Robert C., 3,970,445.

Muirhead, Aubrey S.; Martin, John; Martin, Patrick J.; and Rigler, Ross H., to Muirhead Machinery Ltd. Tree cutting apparatus. 3,970,125, Cl. 144-34.00R.

Muirhead Machinery Ltd.: *See—*
Muirhead, Aubrey S.; Martin, John; Martin, Patrick J.; and Rigler, Ross H., 3,970,125.

Muller-Albrecht, Horst; Quiring, Bernd; Dollhausen, Manfred; and Wulff, Jochen, to Bayer Aktiengesellschaft. Saturated hydroxy polyester urethanes and styrene copolymers. 3,970,717, Cl. 260-859.00R.

Muller, Rudolf: *See—*
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Mullins, Albert Ray: *See—*
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Multifastener Corporation: *See—*
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Pouch, Thomas M.; and Ladouceur, Harold A., 3,969,809.

Multitec AG: *See—*
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Munekata, Mutsuo: *See—*
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Munson, Robert E.; and Buscher, Harold T., to Ball Brothers Research Corporation. Dual frequency microstrip antenna structure. 3,971,032, Cl. 343-770.000.

Murashima, Seiichhiro: *See—*
Ohno, Jiro; Iuchi, Tohru; Tokita, Yasuo; Karasima, Hisanori; Watanabe, Kunitoshi; and Murashima, Seiichhiro, 3,969,943.

Murata Manufacturing Co., Ltd.: *See—*
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Murata, Shigeru: *See—*
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Murayama, Eiichi: *See—*
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Murayama, Naohiro: *See—*
Yoshida, Masafumi; Murayama, Naohiro; and Obara, Hiroshi, 3,969,927.

Murfitt, John Edward; and Pitt, Alastair Martin, to Johnson & Phillips (Capacitors) Limited. Impregnated capacitor and method of manufacture. 3,970,904, Cl. 317-258.000.

Murphy, Frank W., Jr.; Nunneley, J. David; and Cruse, Teddy Howard, to Frank W. Murphy Manufacturer, Inc. Liquid level responsive vent valve. 3,970,099, Cl. 137-101.250.

Murphy, Joseph P., to Avco Corporation. Particle separator. 3,970,439, Cl. 55-306.000.

Muterspaugh, Max Ward, to RCA Corporation. Frequency selective circuit for automatic frequency control and sound signals. 3,970,773, Cl. 178-5.80R.

Myer, Jon H., to Hughes Aircraft Company. Coercivity control and detection signal generating pattern for uniaxially anisotropic ferromagnetic crystal platelets. 3,971,038, Cl. 340-174.0TF.

Myers, John W., to Phillips Petroleum Company. Activation and treatment during cooling of platinum/alumina catalyst with HCl. 3,970,589, Cl. 252-466.0PT.

Myers, Larry K.: *See—*
Norcross, Barry, 3,970,330.

Nabisco, Inc.: *See—*
Steinhart, Gilbert; and Bock, Heinrich, 3,970,189.

Nadeau, Raymond R.; and Wyman, John E., to Itek Corporation. Electrostatic lithographic printing process utilizing hydrophilizing composition. 3,970,455, Cl. 96-33.000.

Nagahara, Yasumori: *See—*
Honda, Saburo; Kunitomo, Kyoji; and Nagahara, Yasumori, 3,970,383.

Nagakura, Akira; Akutagawa, Susumu; and Kurihara, Haruki, to Takasago Perfumery Co., Ltd. Tricyclic hydrocarbon and process for producing the same. 3,970,593, Cl. 252-522.000.

Nagamune, Yasuyuki: *See—*
Inohara, Shu; and Nagamune, Yasuyuki, 3,969,884.

Nagaoka, Yoshihiko: *See—*
Shiraishi, Tatsuo; Kishiwada, Susumu; Shimizu, Shinkichi; Honmaru, Shigern; Ichihashi, Hiroshi; and Nagaoka, Yoshihiko, 3,970,702.

Nagase, Tsuneyuki; Suzukamo, Gohu; and Suzuki, Yoshio, to Sumitomo Chemical Company, Limited. Racemization of optically active amines. 3,970,700, Cl. 260-570.80R.

Naidus, Edward Sidney, to RCA Corporation. Explosion vent construction. 3,969,858, Cl. 52-232.000.

Nakabe, Ryuhei: *See—*
Yasuda, Tooru; Kitamura, Yoshinori; and Nakabe, Ryuhei, 3,970,894.

Nakada, Masahiko; and Maekawa, Takehiko, to Toyota. Arrangement for heating the suction gases of an internal combustion engine. 3,970,062, Cl. 123-122.0AC.

Nakai, Muneaki, to Yashima Chemical Engineering Co., Ltd. Method and apparatus for converting a liquid material into a powder. 3,970,310, Cl. 159-6.0WH.

Nakamoto, Soichi: *See—*
Ito, Tadashi; Nakamoto, Soichi; and Okuno, Youichi, 3,971,048.

Nakamura, Yoichi: *See—*
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Nakanishi Dental Manufacturing Co., Ltd.: *See—*
Nakanishi, Toshimasa, 3,969,823.

Nakanishi, Toshimasa, to Nakanishi Dental Manufacturing Co., Ltd. Dental handpiece for a motor driven reamer. 3,969,823, Cl. 32-27.000.

Nakao, Yoshio: *See—*
Sasajima, Ken-ichi; Doi, Muneharu; Fukuhara, Teruo; Yokota, Akira; Nakao, Yoshio; and Yoneda, Masahiko, 3,970,522.

Nakayama, Masashi: *See—*
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Nakazawa, Sadaharu; and Izumi, Hisashi. Fuel burning apparatus and heat engine incorporating the same. 3,969,899, Cl. 60-670.000.

Nanba, Yasuhiro; Imura, Toshinori; and Saito, Mitsuru, to Minolta Camera Kabushiki Kaisha. Automatic focus control device. 3,970,842, Cl. 250-201.000.

Nanba, Yasuhiro; and Matsuda, Motonobu, to Minolta Camera Kabushiki Kaisha. Light measuring circuit. 3,971,045, Cl. 354-23.00R.

Nashan, Gerd: *See—*
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Nashua Corporation: *See—*
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National Distillers and Chemical Corporation: *See*—
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National Forge Company: *See*—
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National Research Development Corporation: *See*—
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Bianchi, Nereo, 3,970,020.
Nedenskov, Poul, to Aktieselskabet Grindstedvaerket. 1,4-Benzodiazepine derivative. 3,970,645, Cl. 260-239.30D.
Nelson, Arthur L., to Townsend and Townsend. Method and apparatus for molding splices in cables. 3,970,488, Cl. 156-49.000.
Nelson, Arthur L., to Townsend and Townsend. Molding method for splicing electrical cable. 3,970,735, Cl. 264-272.000.
Nelson, Charles W. Method of attaching a hairpiece. 3,970,092, Cl. 132-5.000.
Nelson, Paul T.: *See*—
Toy, Albert; Nelson, Paul T.; and Schafer, Clarence E., 3,969,814.
Nelson, Robert E., to General Motors Corporation. Helicopter power plant control. 3,969,890, Cl. 60-39.150.
Nelson, Victor. Rotary actuator having stationary armature and rotary field. 3,970,980, Cl. 335-253.000.
Nerem, Marvin E.: *See*—
Bainter, Huston K.; and Nerem, Marvin E., 3,969,868.
Neufang, Karlheinz, to Siemens Aktiengesellschaft. PCM time-division multiplex telecommunication network. 3,970,794, Cl. 179-15.0AQ.
Neveux, Jacques, to Chavanoz S.A. Spindle for false twist by friction. 3,969,883, Cl. 57-77.400.
New Folding System Incorporated, The: *See*—
Lanagan, John B.; and Tilson, Stephen H., 3,970,226.
Newman, John David: *See*—
Ladbrooke, Peter Howard; Torlesse, Arthur Timothy; and Newman, John David, 3,970,927.
Nicol, Ronald, to Heinemann Electric Company. Circuit breaker with center trip position. 3,970,976, Cl. 335-21.000.
Nicolai, William S. Tent. 3,970,096, Cl. 135-14.00V.
Niedzielski, Edmund Luke, to Du Pont de Nemours, E. I., and Company. Hydraulic brake fluid composition. 3,970,574, Cl. 252-79.000.
Niemers, Ekkehard: *See*—
Wollweber, Hartmund; Niemers, Ekkehard; Schulz, Hans Peter; Thomas, Herbert; and Andrews, Peter, 3,970,699.
Niemeyer, Robert W., to Alco Standard Corporation. Conduit coupling structure. 3,970,337, Cl. 285-342.000.
Niestroj, Heinrich: *See*—
Deisinger, Franz; Husges, Gert; Bock, Erich; Niestroj, Heinrich; and Henzgen, Detlef, 3,969,910.
Niggemann, Johannes: *See*—
Jabs, Gert; Loew, Gunther; and Niggemann, Johannes, 3,970,618.
Nijman, John Peter, to Bunker Ramo Corporation. Flexible circuit connecting arrangement for interconnection modules. 3,970,802, Cl. 179-98.000.
Nippon Educational Television Company, Ltd.: *See*—
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Nippon Electric Company, Ltd.: *See*—
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Nippon Kogaku K.K.: *See*—
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Okuno, Keno; and Takahata, Kouichi, 3,971,050.
Nippon Kokan Kabushiki Kaisha: *See*—
Yamada, Takeo; Kunioka, Kazuo; and Teramoto, Toyokazu, 3,970,291.
Nippon Oil Company Ltd.: *See*—
Motai, Yoichi; Gouda, Keijiro; and Isono, Atsuya, 3,970,028.
Nippon Seiko Kabushiki Kaisha: *See*—
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Nippon Soda Company Limited: *See*—
Kano, Saburo; Nomura, Osami; Asada, Mitsuo; Ando, Meiki; Matsuda, Michihiko; Yamada, Tomio; Watanabe, Hitoshi; and Taniguchi, Takuzo, 3,970,751.
Nippon Soken, Inc.: *See*—
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Nippon Steel Corporation: *See*—
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Nippon Telegraph and Telephone Public Corporation: *See*—
Takano, Rikuo; Sumitomo, Yuji; Yamamoto, Yoichi; Makita, Tomoo; and Aiba, Masahiko, 3,971,039.
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Sato, Suguru, 3,970,881.
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Nishimura, Kenji; Furusaki, Shinichi; and Hashimoto, Kazuo, to Ube Industries, Ltd. Method for isolating 11-cyano-undecanoic acid in its ammonium salt. 3,970,677, Cl. 260-404.500.
Nishio, Minoru: *See*—
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Nishiyama, Yoshifumi: *See*—
Matsui, Goro; Toda, Koji; Horiishi, Nanao; Wakimoto, Kazuyoshi; Nishiyama, Yoshifumi; Taketa, Tsuneyoshi; and Takama, Kazushi, 3,970,738.
Nishizaki, Hiroshi; Yonekura, Kanji; and Tsuji, Yuichi, to Mitsui Shipbuilding and Engineering Co., Ltd. Crane overload detector using a boom bending moment detector. 3,971,008, Cl. 340-267.00C.
Nishizawa, Kazuro: *See*—
Kaibara, Nobuhiro; and Nishizawa, Kazuro, 3,970,065.
Niskin, Shale Jack, to United States of America, Navy. In situ oceanographic sample separator. 3,969,925, Cl. 73-61.00R.
Niskin, Shale Jack, to United States of America, Navy. Water weighted corer. 3,970,156, Cl. 175-6.000.
Nissan Motor Co., Ltd.: *See*—
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Mizusawa, Mitsutoyo, 3,970,347.
Nixdorf Computer AG: *See*—
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Nobusawa, Tsukumo, to Asahi Kogaku Kogyo Kabushiki Kaisha. Systems for responding to non-uniform scene brightness. 3,971,046, Cl. 354-24.000.
Nofel, Thomas J., to MTD Products Inc. Safety grounding circuits. 3,969,875, Cl. 56-10.200.
Nomura, Osami: *See*—
Kano, Saburo; Nomura, Osami; Asada, Mitsuo; Ando, Meiki; Matsuda, Michihiko; Yamada, Tomio; Watanabe, Hitoshi; and Taniguchi, Takuzo, 3,970,751.
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Norcross, Barry, to Myers, Larry K. Kickstand base for two-wheeled vehicles. 3,970,330, Cl. 280-301.000.
Norinsky, Sidney. Convertible saddle brief case. 3,970,229, Cl. 224-31.000.
Norman, Marvin Neil, to RCA Corporation. Automatic beam current limiter. 3,971,067, Cl. 358-74.000.
Norrbottens Jarnverk AB: *See*—
Santen, Sven; and Grip, Carl Erik, 3,970,290.
Northern Electric Company Limited: *See*—
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Northrop Corporation: *See*—
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Northrup, Richard M.: *See*—
Johnson, Philip M.; and Northrup, Richard M., 3,970,391.
Novak, Ivan, to U.S. Philips Corporation. Method of indicating and/or recording electrical quantities and indicating respectively recording apparatus embodying said method. 3,970,931, Cl. 324-99.00R.
Nowack, Klaus, to Contraves AG. Plural, stacked side by side switch housing array having discrete housing coupling elements. 3,970,812, Cl. 200-307.000.
Nowick, William. Control means for electrically powered transportation means. 3,970,160, Cl. 180-6.500.
Nunneley, J. David: *See*—
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N.V. Technische Maatschappij Marchand-Andriessen: *See*—
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Oak Industries Inc.: *See*—
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Obara, Hiroshi: *See*—
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O'Brien, Jerry, deceased; and O'Brien, Catherine H., executrix. Electro-mechanical amplifier sound transducer. 3,970,804, Cl. 179-131.000.
Ogata, Yasuhiro: *See*—
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Ogawa, Akira: *See—*
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Ogawa, Masao: *See—*
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Ogawa, Masaya; and Furukawa, Tetsuhisa, to Minolta Camera Kabushiki Kaisha. Residual toner removing apparatus. 3,969,785, Cl. 15-301.000.

Ogawa, Toshio; Munekata, Mutsuo; Ozawa, Kenji; and Minai, Kiichi, to Murata Manufacturing Co., Ltd. Ferroelectric ceramic composition. 3,970,572, Cl. 252-62.900.

Ogihara, Sadahide; Nakamura, Yoichi; and Fukui, Osamu, to UBE Industries, Ltd. Method for preparing a modified crystalline propylene polymer. 3,970,722, Cl. 260-878.00R.

O'Hanlon, Edward J. Leakproof roof and method of constructing same. 3,969,861, Cl. 52-309.000.

Ohio Nuclear, Inc.: *See—*
Richey, Joseph B.; Wake, Robert H.; and Keller, John T., 3,970,852.

Ohmori, Sachio; and Takahata, Kouichi, to Nippon Kogaku K.K. System for recording on the film of a camera data relating to the scene being photographed. 3,971,049, Cl. 354-127.000.

Ohnishi, Tatsuo, to Tsubakimoto Chain Co. Fillerless welded chain. 3,969,949, Cl. 74-255.00R.

Ohno, Jiro; Iuchi, Tohru; Tokita, Yasuo; Karasima, Hisanori; Watanabe, Kunitoshi; and Murashima, Seiichhiro, to Nippon Steel Corporation. Method of measuring the temperature of furnace hot stock and apparatus therefor. 3,969,943, Cl. 73-355.0EM.

Ohrberg, Carl Verner, to Danfoss A/S. Radial piston pump. 3,969,986, Cl. 91-492.000.

Ohrin, Leonard J.: *See—*
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Oishi, Sachio: *See—*
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Okamoto, Yasunari: *See—*
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Oki Electric Industry Company, Ltd.: *See—*
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Oksman, Erkki Olavi. Bubble-generating aerator. 3,970,731, Cl. 261-122.000.

Okuno, Keno; and Takahata, Kouichi, to Nippon Kogaku K.K. Electronic flashlight system for cameras. 3,971,050, Cl. 354-128.000.

Okuno, Yositosi: *See—*
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Olson, James R.; and Storey, Robert C., to Eastman Kodak Company. Method for producing improved electrographic developer. 3,970,571, Cl. 252-62.10P.

Olson, N. Thomas; Ault, Earl R.; and Bhaumik, Mani L., to Northrop Corporation. High-power argon/nitrogen transfer laser. 3,970,964, Cl. 331-94.50G.

Onoda Cement Company, Ltd.: *See—*
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Ontel Corporation: *See—*
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Opdahl, Everett W.; and Kim, Chang K., to United States of America, Navy. Hull module weapon or equipment system. 3,969,977, Cl. 89-1.810.

Ophir, David; Shapiro, Marvin; and Komusin, Bruce, to Ontel Corporation. Data transfer error check. 3,970,989, Cl. 340-146.1AG.

Optische Werke G. Rodenstock: *See—*
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O'Sickey, Lawrence B.; and Koski, Jerry V., to Parker-Hannifin Corporation. Tube coupling joint. 3,970,336, Cl. 285-341.000.

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Ottenhues, Ludger; and Meyer, Willi, to Windmoller & Holscher. Apparatus for pre-adjusting the plate cylinders of printing presses. 3,969,826, Cl. 33-184.500.

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Otto, William M., to Jo-Line Tools, Inc. Electronic torque wrench. 3,970,155, Cl. 73-139.000.

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Planchock, Jerry L.; Stewart, Daniel R.; and Brock, Thomas W., 3,970,463.
Shell, James Allen, 3,970,464.
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Owston, William J., to Lord Corporation. Adhesive formulations for bonded metal assemblies with resistance to aggressive environments. 3,970,709, Cl. 260-827.000.

Oxequip Health Industries Inc.: *See—*
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Oxford Industries, Inc.: *See—*
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Oxy Metal Industries Corporation: *See—*
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Nykopp, Erik Albert, 3,970,514.

Ozawa, Kenji: *See—*
Ogawa, Toshio; Munekata, Mutsuo; Ozawa, Kenji; and Minai, Kiichi, 3,970,572.

P.J.K. Projects Limited: *See—*
Kyne, Peter John, 3,969,866.

P. R. Mallory & Co., Inc.: *See—*
Ciliberti, Frank, 3,970,477.

Pace, Burton D.: *See—*
Dalzell, Chester G.; and Pace, Burton D., 3,970,507.

Pace, Incorporated: *See—*
Litt, Kenneth C.; and Siegel, William J., 3,970,234.

Pachop, Merle E.: *See—*
Finger, John F.; and Pachop, Merle E., 3,970,048.

Pagano, Dominick A. Method for tightening a bolt to exert a predetermined tension force by monitoring bolt elongation while the bolt is being installed. 3,969,810, Cl. 29-407.000.

Pagano, Dominick A. Method and apparatus for tightening a bolt to exert a predetermined tension force by monitoring bolt elongation while the bolt is being installed. 3,969,960, Cl. 81-52.40R.

Page, Robert E., to Beloit Corporation. Twin triple chambered gas distribution system for melt blown microfiber production. 3,970,417, Cl. 425-72.00S.

Pallos, Ferenc M.; Lee, Hwalin; and Menn, Julius J., to Stauffer Chemical Company. Certain geranyl phenyl ethers and their epoxides and their use in controlling insects. 3,970,758, Cl. 424-278.000.

Palm, Richard: *See—*
Falkenstein, Georg; Palm, Richard; and Wolff, Dietrich, 3,970,600.

Palmer, David Nelson, to Combustion Engineering, Inc. Ultrasonic coupling method. 3,970,504, Cl. 156-329.000.

Palumbo, Nunzio J., to Louis Marx & Co., Inc. Fastener assembly and fastener thereof. 3,970,399, Cl. 403-231.000.

Pandapas, George, Jr. Devices for selective display of information. 3,969,973, Cl. 84-474.000.

Pandjiris Weldment Co., The: *See—*
Cooper, Cleveland N., 3,970,295.

Panek-Finda, Helena, to U.S. Philips Corporation. Isotope generator provided with a carrier material which in addition to Al_2O_3 contains fully or partly hydrated MnO_2. 3,970,583, Cl. 252-301.150.

Panissidi, Hugh A.: *See—*
Gardineer, Bayard G.; and Panissidi, Hugh A., 3,969,990.

Papenfuhs, Theodor: *See—*
Gengnagel, Kurt; and Papenfuhs, Theodor, 3,970,667.

Pappo, Raphael: *See—*
Collins, Paul W.; and Pappo, Raphael, 3,970,683.

Park-Ohio Industries, Inc.: *See—*
Day, Paul L., 3,970,813.

Parke, Davis & Company: *See—*
Kee Woo, Peter Wing; and Haskell, Theodore Herbert, 3,970,643.

Parker-Hannifin Corporation: *See—*
Jones, Robert L., 3,970,100.
O'Sickey, Lawrence B.; and Koski, Jerry V., 3,970,336.

Parker, Patrick A.: *See—*
Humphreys, Rex T.; Medina, Glenn J.; and Parker, Patrick A., 3,969,897.

Parkins, Derek Ray: *See—*
Garrett, Roy Peter; and Parkins, Derek Ray, 3,970,177.

Parratt, Noel James: *See—*
Cannell, John Corjeag; Leaper, Rodney Seymour; and Parratt, Noel James, 3,970,136.

Parsonage, Harry N., to Mead Corporation, The. Automatic replenishment method and apparatus for photographic processes. 3,970,457, Cl. 96-50.00R.

Partridge, Arthur F. Building truss. 3,969,869, Cl. 52-639.000.

Pascaud, Xavier: *See—*
Regnier, Gilbert; Canevari, Roger; and Pascaud, Xavier, 3,970,661.
Regnier, Gilbert; Canevari, Roger; and Pascaud, Xavier, 3,970,663.

Patelhold Patentverwertungs & Elektro-Holding AG: *See—*
Guanella, Gustav, 3,970,790.

Paterson, Malcolm M.: *See—*
Theodore, Michael J.; Paterson, Malcolm M.; and Schrimper, Vernon L., 3,970,547.

Patouillet, Jean J.: *See—*
Rat, Roger M.; Pollozec, Francois A.; and Patouillet, Jean J., 3,970,511.

Paulsen, Robert W.: *See—*
Deutschmann, William B.; Livenick, Corwin E.; Paulsen, Robert W.; Tyler, Len A.; and Rose, Clifford L., 3,970,880.

Pavonet, Engelhard Wilhelm, to "Societe de Prayon". Method for purifying phosphoric acid. 3,970,741, Cl. 423-321.00S.

Peak, Ben, to Builders Brass Works. Wall bumper. 3,969,786, Cl. 16-86.00A.

Pelton, Peter G.; and Ostrem, Obert M., to Continental Can Company, Inc. Toroidal pressure regulator. 3,970,105, Cl. 137-498.000.

Pelzer, Franz, to Dravo Corporation. Extension compensation and explosion protection device. 3,970,333, Cl. 285-9.00R.

Pendleton, Wesley William; and Thompson, Robert Clifton, to Anaconda Wire & Cable Company. Apparatus for detecting faults in magnet wire insulation without thermally damaging the insulation and which does not respond to impedance indications above a predetermined threshold value. 3,970,924, Cl. 324-54.000.

Penelopegay Rowland Absalom: *See—*
Sutcliffe, Henry; and Ball, Edward, 3,971,017.

Pennings, Henricus Jacobus: *See—*
Moran, David Patrick Joseph; and Pennings, Henricus Jacobus, 3,970,763.

Pepera, Frank R. Hair trimmer attachment. 3,969,819, Cl. 30-200.000.

Peppler, William S.; Keen, Everett M.; and Siciliano, Anthony J., to Diamond International Corporation. Controlled feeding of livestock. 3,970,044, Cl. 119-18.000.

Peressini, Eugene R.; Hill, Robert A.; and Kallis, James M., to Hughes Aircraft Company. High power electrically excited flowing gas laser. 3,970,962, Cl. 331-94.5PE.

Perfect Fit Industries, Inc.: *See—*
Vitale, Joseph, 3,970,509.

Perfect Liberty: *See—*
Yasaka, Toshio; Ito, Ryuzo; and Takagi, Sadao, 3,970,996.

Peters, Edwin F.: *See—*
Jezl, James L.; and Peters, Edwin F., 3,970,611.

Peterson, Gary Ray: *See—*
Bazin, Lucas John; and Peterson, Gary Ray, 3,970,774.

Peterson, Wesley G.: *See—*
Borkovitz, Henry S.; and Peterson, Wesley G., 3,971,007.

Petrosky, Joseph A., Jr.: *See—*
Freeman, Leo B., Jr.; Incerto, Robert J.; and Petrosky, Joseph A., Jr., 3,970,950.

Peyser, Harry A.: *See—*
Herbst, Edward J.; and Peyser, Harry A., 3,970,023.

Pezarro, Salomon, to N.V. Technische Maatschappij Marchand-Andriessen. Method for mutually connecting two strips of a thermoplastic material. 3,970,491, Cl. 156-73.500.

Pfaff Industriemaschinen GmbH: *See—*
Hager, Walter, 3,970,018.

Pfizer Inc.: *See—*
Cross, Peter E.; Dickinson, Roger P.; and Kemp, John E. G., 3,970,757.

Pflueger, Richard: *See—*
Horn, Peter; Cordes, Claus; and Pflueger, Richard, 3,970,634.

Philip Morris Incorporated: *See—*
Iten, Clemens A., 3,970,194.

Phillips, John F.: *See—*
Swisher, George William, Jr.; Smith, Donald W.; and Phillips, John F., 3,970,405.

Phillips Petroleum Company: *See—*
Edmonds, James T., Jr., 3,970,719.
Myers, John W., 3,970,589.

Phillips, Wayne R. Paddle. 3,970,032, Cl. 115-24.100.

Physio Medics, Inc.: *See—*
Loiacono, Vincent R., 3,970,090.

Pickett, John. Solar heater/cooler assembly. 3,970,069, Cl. 126-271.000.

Pier-Amory, Jacques; and Koch, Beat, to Werkzeugmaschinenfabrik Oerlikon-Buhrle AG. Apparatus for damping the forward and return movements of an automatic firing weapon. 3,969,982, Cl. 89-178.000.

Pines, Seemon H.: *See—*
Tull, Roger J.; Czaja, Robert F.; Shuman, Richard F.; and Pines, Seemon H., 3,970,693.

Pioneer Electronic Corporation: *See—*
Komatsubara, Masahiro, 3,970,906.

Pipenhagen, Charles A., Jr. Automatic bicycle transmission. 3,969,948, Cl. 74-244.000.

Pisar, Robert J. Engine speed control for an internal combustion engine adapted for operation with L.P. gas. 3,970,059, Cl. 123-103.00B.

Pitchon, Esra; Chall, Steven Barry; and Schulman, Marvin, to General Foods Corporation. Method for producing sucrose fixed volatile flavors. 3,970,765, Cl. 426-534.000.

Pitney-Bowes, Inc.: *See—*
Calderazzo, Franklin J., 3,969,992.
Irvine, Robert; and Kanning, L. Neil, 3,970,298.

Pitschi, Franz, to Spinner GmbH, Elektrotechnische Fabrik. Coaxial cable fitting. 3,970,355, Cl. 339-177.00R.

Pitt, Alastair Martin: *See—*
Murfitt, John Edward; and Pitt, Alastair Martin, 3,970,904.

Pittet, Alan O.: *See—*
Sanderson, Anne; Schreiber, William L.; van Praac, Michel; Pittet, Alan O.; and Evers, William J., 3,970,701.

Pittet, Rene E., Jr. Low speed aircraft. 3,970,270, Cl. 244-5.000.

Planchock, Jerry L.; Stewart, Daniel R.; and Brock, Thomas W., to Owens-Illinois, Inc. Glasses and glass-ceramics and products made therefrom. 3,970,463, Cl. 106-39.700.

Plantif, Bernard E.: *See—*
Doin, Bernard J.; Plantif, Bernard E.; and Tillac, Jean-Francois, 3,970,266.

Plattier, Marcel; and Teisseire, Paul Jose, to Societe Anonyme Roure Bertrand DuPont. Novel cyclopentanone odoriferous agent. 3,970,682, Cl. 260-468.00K.

Playart Ltd.: *See—*
Pui, Fong, 3,971,016.

Pledger, Richard Payne, to United States of America, Air Force. Mirror steering system. 3,970,373, Cl. 350-285.000.

Plessey Handel und Investments A.G.: *See—*
Ladbrooke, Peter Howard; Torlesse, Arthur Timothy; and Newman, John David, 3,970,927.

Plockl, Johann, to Erwin Sick Optik-Elektronik. Apparatus and a method for reading light-dark or color-contrast codes on articles. 3,970,825, Cl. 235-61.11E.

Plodowski, Tomasz, to Raymond International, Inc. Breakwater construction. 3,969,900, Cl. 61-4.000.

Ploner, Klaus-Jurgen, to Givaudan Corporation. Unsaturated hydrocarbons and process for making same. 3,970,592, Cl. 252-522.000.

Plummer, William T., to Polaroid Corporation. Compact galilean viewfinder. 3,971,052, Cl. 354-219.000.

Pohl, Gerhard: *See—*
Fischer, Joachim; Knorre, Helmut; and Pohl, Gerhard, 3,970,554.

Pohl, Stanley: *See—*
Brody, Frederick; and Pohl, Stanley, 3,970,423.

Polak's Frutal Works B.V.: *See—*
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Polaroid Corporation: *See—*
Bader, Henry; and Feingold, Michael H., 3,970,616.
Baker, Philip G.; and Johnson, Bruce K., 3,971,051.
Plummer, William T., 3,971,052.
Scholz, Donald T., 3,970,377.

Pollozec, Francois A.: *See—*
Rat, Roger M.; Pollozec, Francois A.; and Patouillet, Jean J., 3,970,511.

Polney, Richard J., to Enterprise Machine and Development Corporation. Turbulence generator for yarn texturing air jet. 3,969,799, Cl. 28-1.400.

Ponsinet, Gerard: *See—*
Jolles, Georges; and Ponsinet, Gerard, 3,970,641.

Porth, Frank L., to Black, James A. Coating tray. 3,970,040, Cl. 118-406.000.

Post Office, The: *See—*
Allen, Edgar Robert, 3,970,795.
Enoch, Reginald David; and Jones, Mervyn Evan, 3,971,037.

Postlethwaite, Dennis: *See—*
Oldfield, Derek; and Postlethwaite, Dennis, 3,970,191.

Potlatch Corporation: *See—*
Glover, Clinton G.; Markley, Jack H.; and Young, Patrick J., 3,970,497.

Pouch, Thomas M.; and Ladouceur, Harold A., to Multifastener Corporation. Self-fastening nut, panel assembly and apparatus. 3,969,809, Cl. 29-243.500.

Poulton, Barrie Armstrong; and Bayne, Robert Paton, to Simon-Barron Limited. Handling of materials. 3,970,123, Cl. 141-351.000.

Poupard, Dominique: *See—*
Le Salver, Robert; and Poupard, Dominique, 3,970,162.

PPG Industries, Inc.: *See—*
Gulotta, Joseph A., 3,970,442.
Reiche, Charles Ronald; and Heckman, Jerry A., 3,970,711.
Sopko, John F., 3,970,037.

Prater, Earle Francis, to Birtcher Corporation, The. Printed circuit board retainer. 3,970,198, Cl. 211-41.000.

Pratt, Robert Eugene; and Habzansky, John, to Bray Oil Company. Antiwear additive mixture. 3,970,570, Cl. 252-49.900.

Pravaz, Marcel, to Etudes et Fabrications Aeronautiques. Jumping garment for a parachutist. 3,969,772, Cl. 2-79.000.

Precitec GmbH: *See—*
Schmall, Karl Heinz, 3,970,911.

Premachandra, Bhartur, to Premachandra, Bhartur. Immunoassay for the measurement of total thyroxine in blood serum. 3,970,746, Cl. 424-1.500.

Pressly, Palmer W., Jr. Multi directional motion and vibration triggering device. 3,971,006, Cl. 340-224.000.

Prevorsek, Dusan Ciril; Kwon, Young Doo; Sharma, Raj Kumar; and Gilliam, Edward T., to Allied Chemical Corporation. Testing viscoelastic solids. 3,969,930, Cl. 73-91.000.

Pridgen, Junius Isaac: *See—*
Gehweiler, William Frederick; and Pridgen, Junius Isaac, 3,970,833.

Prince, Zodell W.; Weatherholt, Dallas D.; and Reistino, Adelene Trombatore. Disposable hair roller. 3,970,095, Cl. 132-39.000.

Pritchard, Edwin J., to Western Electric Co., Inc. Method for adhering one surface to another. 3,970,494, Cl. 156-155.000.

Procter & Gamble Company, The: *See—*
Claybaugh, Gene W., 3,970,594.

Procter, Samuel Anderson; and Younger, Robert Dewitt, to Control Data Corporation. Direct reading reactance meter. 3,970,925, Cl. 324-57.00Q.

Production Service & Equipment Incorporated: *See—*
Boyd, Gerald K., 3,970,145.

Profitt, Leslie M.; and Lehmer, Merle E., Jr. Telephone-call toll monitor and indicator. 3,970,793, Cl. 179-7.10R.

Pryor, Clyde Robert: *See—*
Hollingsead, Robert Allen; and Pryor, Clyde Robert, 3,970,351.

PSC Technology, Inc.: *See—*
Wohlrab, Hans Chr., 3,970,386.

Pui, Fong, to Playart Ltd. Electronic chirper. 3,971,016, Cl. 340-384.00E.

Puie, Alexandru: *See—*
Mogos, Ion; Ionescu, Cornel; Angelescu, Dionisie; Dumitrescu, Nicolae; Andreescu, Millo; Neascu, Constantin; Brozici, Mircea; Birzanescu, Mihai; Puie, Alexandru; and Vasilica, Gheorghe, 3,970,074.

Purdy, James P. Electrical apparatus to connect towing vehicle light circuits to a trailer light circuit when the towing vehicle has separate circuits respectively for turning and stop lights and the trailer has a common light circuit for both turning and stop lights. 3,970,860, Cl. 307-10.0LS.

Purex Corporation: *See—*
Barrett, John H., Jr., 3,970,575.

Pyne, James A., Jr.: *See—*
Smale, Charles H.; and Pyne, James A., Jr., 3,970,252.

Pypker, Jacob: *See—*
Stoffelsma, Jan; and Pypker, Jacob, 3,970,689.

Quantel Limited: *See—*
Michael, Peter Colin; and Stalley, Anthony Donald, 3,971,063.

Quasar Electronics Corporation: *See—*
Fenne, Kenneth R., 3,970,782.

Quiring, Bernd: *See—*
Muller-Albrecht, Horst; Quiring, Bernd; Dollhausen, Manfred; and Wulff, Jochen, 3,970,717.

Raduchel, Bernd; Skuballa, Werner; and Vorbruggen, Helmut, to Schering Aktiengesellschaft. Process for the preparation of prostaglandin F_2 and the analogs thereof. 3,970,692, Cl. 260-514.00D.

Raes, Herman, to National Forge Company. Protective shield for pressure vessels. 3,970,208, Cl. 220-3.000.

Raether, Roger J., to Wellendorf, Erwin F. Dislodging device. 3,970,141, Cl. 165-47.000.

Rafferty, Edson Howard; and Kletschka, Harold D., to Bio-Medicus, Inc. Apparatus for use with delicate fluids. 3,970,408, Cl. 415-60.000.

Raines, Kenneth; and Burke, George K., to Burron Medical Products, Inc. Intravenous injection apparatus and needle adapter with filter and method of making same. 3,970,084, Cl. 128-214.00C.

Raines, Kenneth; and Burke, George K., to Burron Medical Products, Inc. Intravenous injection apparatus and needle adapter with filter and method of making same. 3,970,490, Cl. 156-73.100.

Rainey, Don E. Coin controlled vending apparatus. 3,970,216, Cl. 221-125.000.

Rajay Industries, Inc.: *See—*
MacInnes, Hugh; and Uitti, Paul M., 3,969,804.

Ralph M. Parsons Company: *See—*
Beavon, David K., 3,970,743.
Riesenfeld, Fred C., 3,970,744.

Rameson, William Watson, to TRW Inc. Work holding clamp. 3,970,296, Cl. 269-32.000.

Ramsden, Paul S., Jr.: *See—*
Robinson, Prentice; and Ramsden, Paul S., Jr., 3,970,183.

Ranco Incorporated: *See—*
Attridge, Russell G., Jr.; and Kulick, Andrew, 3,970,246.
Caldwell, Roland B., 3,970,061.

Randmere, Uno, to Stromberg-Carlson Corporation. Loudspeaking telephone with improved receive sensitivity. 3,970,786, Cl. 179-1.0VC.

Rapp, Eugen, to E. Rapp Electronik GmbH. Level detector for liquids and other flowable masses. 3,969,941, Cl. 73-290.00R.

Raskin, Seymour H. Load cell amplifier. 3,969,934, Cl. 73-141.00A.

Rat, Roger M.; Pollozec, Francois A.; and Patouillet, Jean J., to Societe Nationale des Poudres et Expolsifs, Antar Petroles de l'Atlantique: Antargaz. Process and installation for concentrating dilute solutions of corrosive products. 3,970,511, Cl. 159-13.00C.

Rathert, Horst: *See—*
Riedel, Dieter; Rathert, Horst; and Grannemann, Gerhard, 3,969,797.

Rau, Jim Lee; and White, Hollis Newcomb, Jr., to TRW Inc. Drive assembly. 3,969,950, Cl. 74-391.000.

Rauser, Irma Marita: *See—*
Stark, Sven Olof Soren; Rauser, Jan Axel Ingemar; and Rauser, Irma Marita, 3,970,426.

Rauser, Jan Axel ingemar: *See—*
Stark, Sven Olof Soren; Rauser, Jan Axel Ingemar; and Rauser, Irma Marita, 3,970,426.

Raymond International, Inc.: *See—*
Plodowski, Tomasz, 3,969,900.

Raytheon Company: *See—*
Clements, Ivor K.; and Spencer, George R., 3,970,868.
Theodore, Michael J.; Paterson, Malcolm M.; and Schrimper, Vernon L., 3,970,547.

RCA Corporation: *See—*
Bazin, Lucas John; and Peterson, Gary Ray, 3,970,774.
Blust, Henry Leo; Lindburg, Norman Lee; and Henry, Dale Vernon, 3,970,235.
Branton, Tom Wendell, 3,970,456.
Dingwall, Andrew Gordon Francis, 3,971,004.
Harwood, Leopold Albert; and Wittmann, Erwin Johann, 3,970,948.
Kirschner, Thomas Francis, 3,970,317.
Kosonocky, Walter Frank, 3,971,003.
Milbourn, Edward Marshall, 3,971,064.
Muterspaugh, Max Ward, 3,970,773.
Naidus, Edward Sidney, 3,969,858.
Norman, Marvin Neil, 3,971,067.
Suchko, Adam John, 3,970,915.
Weisbecker, Joseph A., 3,970,998.
Willis, Donald Henry, 3,970,895.

Reader, John R., Jr.; Seago, James L.; and Williamson, James A., Jr., to Du Pont de Nemours, E. I., and Company. Method and apparatus for nox analysis. 3,970,430, Cl. 23-232.00R.

Recht, Howard L., to Rockwell International Corporation. Decreasing the cyanide and heavy metal content of an aqueous solution. 3,970,531, Cl. 204-149.000.

Recreational & Scientific Devices, Inc.: *See—*
Dennen, Robert S., 3,969,914.

Redactron Corporation: *See—*
Marino, Francis C., 3,970,896.

Redner, Sheldon, to Rothfeld, Stephen. Fortune telling game. 3,970,315, Cl. 273-161.000.

Reed Tool Company: *See—*
Harris, Jesse, 3,970,106.

Reeder, Perry E.; and Williams, Leonard M., to Exxon Research and Engineering Company. Wet gas scrubbing process. 3,970,740, Cl. 423-242.000.

Rees, James D., to Xerox Corporation. Color development apparatus. 3,970,042, Cl. 118-637.000.

Regan, Albert John, to BOC Limited. Flowing gas laser gas regeneration system. 3,970,957, Cl. 331-94.50G.

Regie Nationale des Usines Renault: *See—*
Dachicourt, Augustin; and Krin, Rene, 3,970,292.
Henault, Claude; and Cochard, Pierre, 3,970,054.
Le Salver, Robert; and Poupard, Dominique, 3,970,162.

Regnier, Gilbert; Canevari, Roger; and Pascaud, Xavier, to Science Union et Cie, Societe Francaise de Racherche Medical. 2-Amino, 5-carbamoyl pyridine compounds. 3,970,661, Cl. 260-295.50A.

Regnier, Gilbert; Canevari, Roger; and Pascaud, Xavier, to Science Union et Cie, Societe Francaise de Recherche Medical. Certain amino-nicotinamide derivatives. 3,970,663, Cl. 260-295.50A.

Reiche, Charles Ronald; and Heckman, Jerry A., to PPG Industries, Inc. Method of producing glycols. 3,970,711, Cl. 260-635.00E.

Reid, Robert John, to Reid, Robert John. Deformingly interlocked structural joint. 3,970,400, Cl. 403-242.000.

Reid, William R., Jr., to Imodco, Inc. Mooring and cargo transfer system for difficult handling cargo. 3,969,781, Cl. 9-8.00P.

Reiff, Helmut: *See—*
Weber, Karl-Arnold; Reiff, Helmut; and Dieterich, Dieter, 3,970,601.

Reinhardt, Robert M.: *See—*
Kullman, Russell M. H.; and Reinhardt, Robert M., 3,970,424.

Reisdorff, Josef: *See—*
Aichinger, Gerd; Haberkorn, Axel; Kolling, Heinrich; Kranz, Eckart; and Reisdorff, Josef, 3,970,752.

Reissinger, Karl-Hermann: *See—*
Scharfe, Gerhard; Schwerdtel, Wulf; Swodenk, Wolfgang; Engelhard, Bruno; Grolig, Johann; Martin, Manfred; and Reissinger, Karl-Hermann, 3,970,713.

Reistino, Adelene Trombatore: *See—*
Prince, Zodell W.; Weatherholt, Dallas D.; and Reistino, Adelene Trombatore, 3,970,095.

Renn, Robert Maurice: *See—*
Hopkins, John Root; Renn, Robert Maurice; and Southard, Robert Keith, 3,970,354.

Resk, E. Edward. Tilt mounting. 3,970,274, Cl. 248-185.000.

Rexham Corporation: *See—*
Swafford, Clifton S.; Caldwell, Thurman T.; and Dungan, William J., 3,970,242.

Rhone-Poulenc S.A.: *See—*
Bargain, Michel, 3,970,714.
Jolles, Georges; and Ponsinet, Gerard, 3,970,641.

Riblet, Henry J. Scaffold bracket. 3,970,277, Cl. 248-246.000.

Ricard, Jacques, to Cibie Projecteurs. Motor vehicle headlamps. 3,970,836, Cl. 240-41.00R.

Rich, Joseph, Jr.: *See*—
Vian, Joel Dimas, 3,970,289.

Richards, Derek John, to Mecanaids Limited. Toilet aids. 3,969,778, Cl. 4-254.000.

Richey, Joseph B.; Wake, Robert H.; and Keller, John T., to Ohio Nuclear, Inc. Process and apparatus for scanning sections of radiation. 3,970,852, Cl. 250-363.00S.

Ricoh Co., Ltd.: *See*—
Honda, Saburo; Kunitomo, Kyoji; and Nagahara, Yasumori, 3,970,383.

Riedel, Dieter; Rathert, Horst; and Grannemann, Gerhard, to Drabert Sohne. Apparatus for regulating the shearing of pile fabric. 3,969,797, Cl. 26-15.00R.

Rieger, Franz; Linder, Ernst; and Schmidt, Peter Jurgen, to Robert Bosch G.m.b.H. Method and apparatus for monitoring the activity of catalytic reactors. 3,969,932, Cl. 73-118.000.

Rieger, Klaus: *See*—
Brotz, Walter; Engelmann, Manfred; and Rieger, Klaus, 3,970,624.

Riem, George. Hydro-electric generation of power from small bodies of water. 3,970,859, Cl. 290-54.000.

Riesenfeld, Fred C., to Ralph M. Parsons Company. Process for the production of sulfur from sulfur dioxide extracted from gas streams. 3,970,744, Cl. 423-574.00R.

Rieter Machine Works, Ltd.: *See*—
Bruggisser, Klaus; Graf, Felix; Mandl, Gerhard; and Ruegg, Albert, 3,970,260.

Rigby, Peter Anthony; Hodgson, Ralph; and Guest, David Hubert, to Hewlett-Packard Limited. Method and apparatus for measuring the group delay characteristics of a transmission path. 3,970,926, Cl. 324-57.00R.

Rigler, Ross H.: *See*—
Muirhead, Aubrey S.; Martin, John; Martin, Patrick J.; and Rigler, Ross H., 3,970,125.

Ring, Howard D., to Xerox Corporation. Writing apparatus having wear resistant material. 3,971,042, Cl. 346-139.00C.

Ringwald, Eugene L.: *See*—
Lawton, Ernest L.; and Ringwald, Eugene L., 3,970,635.

Rist, Donald Hammond; and Turley, Barry Jay, to General Electric Company. Prime mover speed responsive load control for electrically propelled traction vehicles. 3,970,858, Cl. 290-14.000.

Ritzhaupt, Anneliese: *See*—
Dahmen, Manfred; Ritzhaupt, Anneliese; and Zurheide, Manfred, 3,970,487.

Rivault, Jean-Paul: *See*—
Gerbier, Gerard; and Rivault, Jean-Paul, 3,970,475.

Rivers, William David Richard: *See*—
Wilcox, David Mark; and Rivers, William David Richard, 3,970,768.

Roback, Kenneth J.: *See*—
Seyler, Gerard; and Roback, Kenneth J., 3,970,986.

Robards, David S., to Hi-Lo Powered Stirrups, Inc. Guide block for a cable. 3,970,287, Cl. 254-190.00R.

Robert Bosch G.m.b.H.: *See*—
Brune, Gerhard; Staib, Helmut; Kochendorfer, Heinrich; Hans, Waldemar; Ropstorff, Walter; Leiber, Heinz; and Kirstein, Lothar, 3,970,111.
Eheim, Franz; Hofer, Gerald; Konrath, Karl; and Laufer, Helmut, 3,970,064.
Mayr, Theodor; Buchta, Siegfried; Kleeberger, Rudolf; and Bauer, Otto, 3,970,063.
Rieger, Franz; Linder, Ernst; and Schmidt, Peter Jurgen, 3,969,932.
Schmitt, Edgar; and Konrath, Karl, 3,970,066.

Roberts, Keith E. Means to vibrate chain link fabric. 3,969,828, Cl. 34-14.000.

Robinson, Prentice; and Ramsden, Paul S., Jr., to Centronics Data Computer Corporation. Random access line printer. 3,970,183, Cl. 197-1.00R.

Robinson, Stephen Joseph: *See*—
Alcock, Robert Nicholas; Vincent, Richard Paul; and Robinson, Stephen Joseph, 3,971,027.

Rock, Erich; and Mages, Bernhard, to Blum Gesellschaft m.b.H. Hinge device. 3,969,787, Cl. 16-129.000.

Rockaway Corporation: *See*—
Varga, Leroy M., 3,970,118.

Rockwell International Corporation: *See*—
Adkins, Larry R., 3,970,778.
Burkes, William M.; and Miller, William H., 3,970,253.
Kiehl, William C.; Moore, Thomas F.; and Teague, Jimmie C., 3,970,182.
Recht, Howard L., 3,970,531.
Stangeland, Maynard L., 3,970,030.

Rodell, Michael B.: *See*—
Brockemeyer, Eugene W.; and Rodell, Michael B., 3,970,750.

Rodova, Miroslava: *See*—
Lochman, Lubomir; Rodova, Miroslava; and Trekoval, Jiri, 3,970,609.

Rogers, Charles G., Jr. Hand roller massage device. 3,970,078, Cl. 128-57.000.

Rogers, Kenneth A., to Shamrock Golf Company. Golf iron manufacture. 3,970,236, Cl. 228-196.000.

Rohde, Wolfgang: *See*—
Beck, Kurt-Gunther; Rohde, Wolfgang; Echterhoff, Heinrich; and Nashan, Gerd, 3,970,523.

Rohm and Haas Company: *See*—
Miller, John J.; Baus, Richard E.; and Lewis, Sheldon N., 3,970,633.

Rohr, Andre, to Societe Anonyme des Ateliers de Secheron. Method and apparatus for the detection of short circuits. 3,970,901, Cl. 317-49.000.

Rolfson, Thomas C.: *See*—
Hart, John W.; and Rolfson, Thomas C., 3,970,584.

Ropstorff, Walter: *See*—
Brune, Gerhard; Staib, Helmut; Kochendorfer, Heinrich; Hans, Waldemar; Ropstorff, Walter; Leiber, Heinz; and Kirstein, Lothar, 3,970,111.

Rosaen, Borje O., to Fosdick, Dale P., a part interest. Fluid filtering device. 3,970,566, Cl. 210-452.000.

Roscoe, Theodore J., Jr.: *See*—
Curington, Alfred R.; and Roscoe, Theodore J., Jr., 3,970,335.

Rose, Clifford L.: *See*—
Deutschmann, William B.; Livenick, Corwin E.; Paulsen, Robert W.; Tyler, Len A.; and Rose, Clifford L., 3,970,880.

Roseby, Bernard. Adjustable pipe wrench. 3,969,963, Cl. 81-66.00A.

Rosinski, Edward Joseph; and Rubin, Mae Koenig, to Mobil Oil Corporation. Hydrocarbon conversion with ZSM-12. 3,970,544, Cl. 208-111.000.

Ross, Arthur W. Apparatus for use in stringing power lines. 3,970,286, Cl. 254-134.30R.

Ross, Danny E.; and Mueller, James M., to Motorola, Inc. Dialing apparatus for a portable radio telephone. 3,970,801, Cl. 179-41.00A.

Ross, Joseph A.: *See*—
Di Matteo, Paul L.; Ross, Joseph A.; and Stern, Howard K., 3,970,361.

Roth, Steven C.: *See*—
Edelman, Seymour; Roth, Steven C.; and Mayo-Wells, John F., 3,970,862.

Roth, Walter L.; and Farrington, Gregory C., to General Electric Company. Solid state electrochemical cell. 3,970,473, Cl. 136-83.00R.

Rothery, Brian: *See*—
Fry, Sidney; Crabtree, Terence Edward; and Rothery, Brian, 3,970,550.

Rothfeld, Stephen: *See*—
Redner, Sheldon, 3,970,315.

Rothman, Mathew, to United States of America, Air Force. Mass focus explosive layered bomblet. 3,970,005, Cl. 102-67.000.

Rotter, Christoph: *See*—
Geyer, Hans; Rotter, Christoph; and Welsch, Wolfgang, 3,970,363.

Rowe, Wilhelm; and Gerresheim, Jost, to International Harvester Company. Motor vehicle. 3,970,161, Cl. 180-54.00A.

Rowley, Jack, to Berisfords Limited. Label stock overprinting machine. 3,970,000, Cl. 101-181.000.

Rubin, Mae Koenig: *See*—
Rosinski, Edward Joseph; and Rubin, Mae Koenig, 3,970,544.

Rubio, Alfred M., to National Sanitary Laboratories, Inc. Two-coin-operated dispensing mechanism. 3,970,181, Cl. 194-63.000.

Ruby Net Hosoki Kabushiki Kaisha: *See*—
Yoshimura, Takehisa, 3,970,503.

Ruchlak, Kazimir; Albers, Ernst-August; and Fester, Walter, to Hoechst Aktiengesellschaft. Polymerization process. 3,970,610, Cl. 526-62.000.

Ruegg, Albert: *See*—
Bruggisser, Klaus; Graf, Felix; Mandl, Gerhard; and Ruegg, Albert, 3,970,260.

Ruegger, Edgar; and Meister, Stefan, to Buhler AG. Grinding mill. 3,970,256, Cl. 241-231.000.

Rueppel, Melvin L., to Monsanto Company. N-(perfluoroacyl)-N-phosphonomethyl glycine compounds, method of preparing same. 3,970,695, Cl. 260-534.00R.

Rugg, Arthur C.: *See*—
Sinnock, Pomeroy; Lauer, Joseph Robert; Manthei, David H.; and Rugg, Arthur C., 3,970,134.

Rukavina, George: *See*—
Marsden, Ronald Eric; Webb, Franklyn Walter; and Rukavina, George, 3,969,920.

Runge, Hartmut: *See*—
Boroffka, Hartmut; Krimmel, Eberhard; and Runge, Hartmut, 3,970,854.

Rush, Donald J.: *See*—
Stephenson, Fred J.; and Rush, Donald J., 3,969,864.

Russell, Anthony William: *See*—
Russell, Michael King; and Russell, Anthony William, 3,970,877.

Russell, Lewis K., to Signetics Corporation. Pseudo-complementary decode driver. 3,970,865, Cl. 307-218.000.

Russell, Michael King; and Russell, Anthony William. Power generation in underground drilling operations. 3,970,877, Cl. 310-8.300.

Ryan, William John: *See*—
Gates, Gerald Alan; and Ryan, William John, 3,970,819.

Rymes, William H. Receiver apparatus. 3,971,019, Cl. 343-7.400.

S. C. Johnson & Son, Inc.: *See*—
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S.T. Dupont: *See*—
Broux, Roland, 3,970,734.

Saab-Scania Aktiebolag: *See*—
Kohlberg, Ulrich, 3,970,128.

Saeki, Keiso: *See*—
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Saft-Societe des Accumulateurs Fixes et de Traction: *See*—
Gerbier, Gerard; and Rivault, Jean-Paul, 3,970,475.
Sagami Chemical Research Center: *See*—
Kondo, Kiyosi; Matsumoto, Masakatsu; and Mori, Fumio, 3,970,673.
Sage, William S. Lineal controlled resistance device. 3,970,985, Cl. 338-162.000.
Sahlin, Anders Lennart, to Anders Sahlin AB. Blanks for coffins. 3,969,798, Cl. 27-4.000.
Saice, Dwayne D. Cardiovascular catheter seal device. 3,970,089, Cl. 128-348.000.
Saint-Gobain Industries: *See*—
Sauer, Gerd, 3,971,030.
Saito, Hiroshi: *See*—
Kaiwa, Yataro; and Saito, Hiroshi, 3,970,371.
Saito, Kikuo: *See*—
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Saito, Mitsuru: *See*—
Nanba, Yasuhiro; Imura, Toshinori; and Saito, Mitsuru, 3,970,842.
Sakai, Kunio: *See*—
Kawada, Tsutomu; Sakai, Kunio; and Mori, Kenichi, 3,970,991.
Sakai, Toshimitsu: *See*—
Miyao, Takayuki; Maeda, Hiroaki; Sato, Masanori; and Sakai, Toshimitsu, 3,969,958.
Sakurai, Munekazu: *See*—
Itoh, Tsutomu; Sakurai, Munekazu; Yamamoto, Masahiro; and Okamoto, Yasunari, 3,970,905.
Sakurai, Yoshitoshi; and Okura, Takao, to Honda Giken Kogyo Kabushiki Kaisha. Exhaust gas emission control device for multi-cylinder engines. 3,969,893, Cl. 60-282.000.
Salimbeni, Aldo: *See*—
Manghisi, Elso; Salimbeni, Aldo; and Mennella, Pietro, 3,970,672.
Salka, Barry A.: *See*—
Carmello, Robert; Salka, Barry A.; and Corey, Garland G., 3,970,576.
Salle, Robert: *See*—
Cohen, Choua; Durif Varambon, Durif; Salle, Robert; and Sillion, Bernard, 3,970,630.
Salmond, William G., to Upjohn Company, The. Novel process and intermediate compounds used is preparation of -Δ5,7- steroid dienes. 3,970,676, Cl. 260-397.200.
Salomon, Georges Pierre Joseph, to S.A. Etablissements Francois Salomon & Fils. Safety ski binding device. 3,970,326, Cl. 280-626.000.
Salzmann, Theodor; Wesselak, Franz; and Timpe, Wolfgang, to Siemens Aktiengesellschaft. Circuit arrangement including a number of converters, in particular direct converters, in Y connection. 3,970,914, Cl. 321-2.000.
Sama, Claudio, to Sandoz Ltd. Deaerating arrangement for dialyzer. 3,970,438, Cl. 55-190.000.
Sander, Nils Borje Lennart, to Svenska Aktiebolaget Bromsregulator. Device in a fluid pressure actuated brake unit for enabling the outgoing push rod to be brought back from the outside. 3,970,173, Cl. 188-203.000.
Sanders Associates, Inc.: *See*—
Cann, Alfred J., 3,971,021.
Johnson, Philip M.; and Northrup, Richard M., 3,970,391.
Sanderson, Anne; Schreiber, William L.; van Praac, Michel; Pittet, Alan O.; and Evers, William J., to International Flavors & Fragrances Inc. Lower alkenals. 3,970,701, Cl. 260-601.00R.
Sandoz, Inc.: *See*—
Brockemeyer, Eugene W.; and Rodell, Michael B., 3,970,750.
Sandoz Ltd.: *See*—
Balzer, Hans; Fleck, Fritz; and Schmid, Hans-Rudolf, 3,970,647.
Bohler, Hans; and Griesser, Rolf, 3,970,649.
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Sangamo Electric Company: *See*—
McCollum, Samuel C., 3,970,861.
Sankyo Kogaku Kogyo Kabushiki-Kaisha: *See*—
Takagi, Katsuhide; and Fukasawa, Toshiro, 3,970,378.
Sansing, James Earl: *See*—
Moore, William Percy; Sansing, James Earl; and Williamson, Harold Daniel, 3,970,625.
Santen, Sven; and Grip, Carl Erik, to SKF Industrial Trading and Development Company, B.V.; and Norrbottens Jarnverk AB, part interest to each. Arrangement for feeding. 3,970,290, Cl. 266-138.000.
Santulli, Domenic J.: *See*—
Bernstein, Alvin H.; and Santulli, Domenic J., 3,969,791.
Sasajima, Ken-ichi; Doi, Muneharu; Fukuhara, Teruo; Yokota, Akira; Nakao, Yoshio; and Yoneda, Masahiko, to Takeda Chemical Industries, Ltd. Method for the production of D-ribose. 3,970,522, Cl. 195-112.000.
Sasaki, Hiroshi: *See*—
Kinuhata, Koji; Amano, Kitsutaro; Sasaki, Hiroshi; Yamamoto, Hideo; Shibata, Kosho; and Yamada, Kazuo, 3,970,776.
Sasano, Mitunori, to Toyota Jidosha Kogyo Kabushiki Kaisha. Fuel control apparatus. 3,970,060, Cl. 123-119.00R.
Sather, Eugene: *See*—
Kearney, Robert L.; and Sather, Eugene, 3,970,385.
Sato, Akihiro, to Tomy Kogyo Co., Inc. Racing game. 3,970,309, Cl. 273-86.00B.
Sato, Akira: *See*—
Shiba, Keisuke; Hinata, Masanao; Sato, Akira; Ogawa, Akira; and Kato, Hirotetu, 3,970,461.
Sato, Itsuzo; and Saito, Kikuo, to Tokyo Shibaura Electric Co., Ltd. Multi-stage differential amplifier circuit with means for compensating the temperature drift of a constant current source transistor. 3,970,947, Cl. 330-23.000.
Sato, Masamichi; and Tezuka, Shigeru, to Xerox Corporation. Electrophotographic device for liquid development. 3,970,043, Cl. 118-637.000.
Sato, Masanori: *See*—
Miyao, Takayuki; Maeda, Hiroaki; Sato, Masanori; and Sakai, Toshimitsu, 3,969,958.
Sato, Shotaro. Heat exchange package for food. 3,970,068, Cl. 126-263.000.
Sato, Suguru, to Nippondenso Co., Ltd. Rectifier assembly. 3,970,881, Cl. 310-68.00D.
Sauer, Gerd, to Saint-Gobain Industries. Antenna window. 3,971,030, Cl. 343-713.000.
Saum, George A.: *See*—
Connors, William P.; Glaenzer, Richard H.; Saum, George A.; and Wagner, Robert G., 3,971,057.
Savage, Elton Stuart; and Chen, Jeffrey J., to Dravo Corporation. Gas removal from deep-bed filters. 3,970,555, Cl. 210-80.000.
Savides, Christos: *See*—
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Hardy, William Baptist; and Savides, Christos, 3,970,644.
Savin Business Machines Corporation: *See*—
Baer, James A.; Clark, Charles B.; and Schaefer, Louis F., 3,970,036.
Sawamura, Osamu: *See*—
Yamamoto, Eisuke; Sugiura, Susumu; and Sawamura, Osamu, 3,970,384.
Schadlich, Gunther: *See*—
Moraw, Roland; Schadlich, Gunther; and Horn, Klaus, 3,970,357.
Schaedler, Raymond J.; and Marcantonio, Livio F., to Chicago Pneumatic Tool Company. Safety inlet air valve control arrangement for air powered hand held tool. 3,970,110, Cl. 137-613.000.
Schaefer, Louis F.: *See*—
Baer, James A.; Clark, Charles B.; and Schaefer, Louis F., 3,970,036.
Schafer, Clarence E.: *See*—
Toy, Albert; Nelson, Paul T.; and Schafer, Clarence E., 3,969,814.
Schaffeler, Alois; and Moller, Wolfgang, to J. & J. Marquardt. Electric switch having a time-delay mechanism. 3,970,807, Cl. 200-34.000.
Schaper, Karl. Contra-flow washing machine. 3,969,913, Cl. 68-143.000.
Scharfe, Gerhard; Schwerdtel, Wulf; Swodenk, Wolfgang; Engelhard, Bruno; Grolig, Johann; Martin, Manfred; and Reissinger, Karl-Hermann, to Bayer Aktiengesellschaft. Process for the production of allyl alcohol. 3,970,713, Cl. 260-638.00R.
Schauer, George A. Internal combustion engine. 3,970,057, Cl. 123-51.0BA.
Scheben, John A.; Hinnenkamp, James A.; and Mador, Irving L., to National Distillers and Chemical Corporation. Oxidation of ethylene to acetic acid. 3,970,697, Cl. 260-533.00R.
Schelkmann, Wilhelm, to Vakuum Vulk Holdings Ltd. Tread for the recapping of tires and method of making the same. 3,970,131, Cl. 152-185.000.
Schenck, Paula: *See*—
Fogel, Samuel; Foster, Patricia L.; Schenck, Paula; and Walker, William W., Jr., 3,969,844.
Scherbner, Paul J.: *See*—
McGurty, James A.; and Scherbner, Paul J., 3,970,449.
Schering Aktiengesellschaft: *See*—
Raduchel, Bernd; Skuballa, Werner; and Vorbruggen, Helmut, 3,970,692.
Scheu Manufacturing Company: *See*—
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Schilperoort, Cornelis: *See*—
Van Diepenbroek, Alfred Erich Wibrandt; Wormgoor, Jan Hendrik; and Schilperoort, Cornelis, 3,970,437.
Schindler, Donald G., to United States Steel Corporation. Weld tracking mechanism. 3,970,910, Cl. 318-576.000.
Schindler, Jean-Pierre: *See*—
Veuilleumier, Cyril; Triponez, Andre; Schindler, Jean-Pierre; and Schwab, Michel, 3,969,888.
Schinner, Thomas J.: *See*—
Kleimeyer, Vermon T.; and Schinner, Thomas J., 3,970,826.
Schlaeppi, Rene: *See*—
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Walton, Charles A.; Kohler, Robert D.; and Sidlauskas, David P., 3,970,824.
Schlaupitz, Wolfgang: *See*—
Glanemann, Rudolf; and Schlaupitz, Wolfgang, 3,970,341.
Schliebs, Reinhard; Wechsberg, Manfred; and Meussdoerffer, Johann Nikolaus, to Bayer Aktiengesellschaft. Perfluoroalkane sulfonamidoalkane phosphonic and phosphonic acid derivatives. 3,970,586, Cl. 252-355.000.
Schlottmann, Herman; and Melchior, John G. Retractable stop. 3,970,180, Cl. 193-35.00A.
Schmall, Karl Heinz, to Precitec GmbH. Apparatus for distance control. 3,970,911, Cl. 318-607.000.
Schmid, Hans, to Meteor AG. Device for applying adhesive tape to a wire coil. 3,970,259, Cl. 242-7.080.
Schmid, Hans-Rudolf: *See*—
Balzer, Hans; Fleck, Fritz; and Schmid, Hans-Rudolf, 3,970,647.

Schmid, Markus; and Bruderer, Werner, to Concast AG. Method for applying flux powder to the bath level in a continuous casting mold during continuous casting. 3,970,135, Cl. 164-4.000.

Schmidgall, Earl R.: *See—*
Miller, Russell A.; and Schmidgall, Earl R., 3,970,071.

Schmidt, Jacob E., to McGraw-Edison Company. Air-vented leakproof battery cell. 3,970,480, Cl. 136-177.000.

Schmidt, Paul, to Tracto-Technik. Ram-borer apparatus. 3,970,157, Cl. 175-22.000.

Schmidt, Peter Jurgen: *See—*
Rieger, Franz; Linder, Ernst; and Schmidt, Peter Jurgen, 3,969,932.

Schmidt, Robert W.; Gallet, John R.; and Czyz, Thomas L., to Copar Corporation. Corrugator control system. 3,970,489, Cl. 156-64.000.

Schmit, Eugene R.: *See—*
Hansen, James E.; and Schmit, Eugene R., 3,970,908.

Schmitt, Edgar; and Konrath, Karl, to Robert Bosch G.m.b.H. RPM regulator for fuel injection pumps. 3,970,066, Cl. 123-140.00A.

Schneider, Abraham; Wood, Stanley E.; and Bryant, James T., to Sun Ventures, Inc.; and United States of America, Navy. Liquid propellant for a gun. 3,969,979, Cl. 89-7.000.

Schneider, Howard R.: *See—*
McLaren, Edwin C.; and Schneider, Howard R., 3,970,215.

Schnizler, Albrecht, Jr., to Metabowerke KG Closs, Rauch, & Schnitzler. Chuck for drill. 3,970,323, Cl. 279-64.000.

Schoenberg, Emanuel; and Hanlon, Thomas L., to Goodyear Tire & Rubber Company, The. Processing method for synthetic rubbers. 3,970,724, Cl. 260-894.000.

Schofield, George L., Jr.; and Lignell, James L., to Xenex Corporation. Presence detecting system with self-checking. 3,970,846, Cl. 250-221.000.

Schofl, Wolfgang: *See—*
Mayr, Gert Michael; and Schofl, Wolfgang, 3,970,314.

Schokkenbroek, Jan: *See—*
Arnesen, Arne Georg; and Schokkenbroek, Jan, 3,970,814.

Scholtz, Berthold: *See—*
Stonner, Hans-Martin; Scholtz, Berthold; and Hartmann, Rainer, 3,970,432.

Scholz, Donald T., to Polaroid Corporation. Sound motion picture processing and projection system. 3,970,377, Cl. 352-14.000.

Schott, John R.; and Gallagher, Timothy W., to Calspan Corporation. Profile technique for calibrating infrared thermal imaging systems. 3,970,848, Cl. 250-252.000.

Schreiber, William L.: *See—*
Sanderson, Anne; Schreiber, William L.; van Praac, Michel; Pittet, Alan O.; and Evers, William J., 3,970,701.

Schrimper, Vernon L.: *See—*
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Schubert & Salzer Maschinenfabrik Aktiengesellschaft: *See—*
Deisinger, Franz; Husges, Gert; Bock, Erich; Niestroj, Heinrich; and Henzgen, Detlef, 3,969,910.

Schuldt, Paul H.: *See—*
Holm, Robert E.; and Schuldt, Paul H., 3,970,443.

Schulman, Marvin: *See—*
Pitchon, Esra; Chall, Steven Barry; and Schulman, Marvin, 3,970,765.

Schultz, John C., to Houdaille Industries, Inc. Fluid railroad passenger car suspension. 3,970,009, Cl. 105-164.000.

Schultz, Thomas J.; and Hemsath, Klaus H., to Midland-Ross Corporation. Apparatus and method for methanation. 3,970,435, Cl. 48-61.000.

Schulz, Hans Peter: *See—*
Wollweber, Hartmund; Niemers, Ekkehard; Schulz, Hans Peter; Thomas, Herbert; and Andrews, Peter, 3,970,699.

Schutten, Herman P.: *See—*
Jaskolski, Stanley V.; Lade, Robert W.; Schutten, Herman P.; Spellman, Gordon B.; and Van Horn, Lawrence E., 3,971,056.

Schutz, Hans Ulrich; Back, Gerhard; and Beffa, Fabio, to Ciba-Geigy Corporation. Unsymmetrical mono-sulfo containing chromium complexes of azo dyes. 3,970,615, Cl. 260-145.00B.

Schuylkill Chemical Company: *See—*
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Mecca, Sebastian B., 3,970,756.

Schwab, Michel: *See—*
Veuilleumier, Cyril; Triponez, Andre; Schindler, Jean-Pierre; and Schwab, Michel, 3,969,888.

Schwander, Hansrudolf: *See—*
Dengler, Siegfried; Loew, Peter; Zickendraht, Christian; and Schwander, Hansrudolf, 3,970,675.

Schwarcz, Andor, to Nashua Corporation. Release agents suitable for use with pressure-sensitive adhesive tapes. 3,970,599, Cl. 260-77.5CH.

Schweickart, Albert J.: *See—*
Collins, Stephen M.; and Schweickart, Albert J., 3,970,539.

Schwerdtel, Wulf: *See—*
Scharfe, Gerhard; Schwerdtel, Wulf; Swodenk, Wolfgang; Engelhard, Bruno; Grolig, Johann; Martin, Manfred; and Reissinger, Karl-Hermann, 3,970,713.

Science Union et Cie, Societe Francaise de Racherche Medical: *See—*
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Science Union et Cie, Societe Francaise de Recherche Medical: *See—*
Regnier, Gilbert; Canevari, Roger; and Pascaud, Xavier, 3,970,663.

Scifres, Donald R.: *See—*
Streifer, William; Scifres, Donald R.; and Burnham, Robert D., 3,970,958.

SCM Corporation: *See—*
McGinniss, Vincent Daniel, 3,970,535.

Scott, Delbert. Door hinge. 3,969,846, Cl. 49-504.000.

Scott, Mark E. Inflation device. 3,970,122, Cl. 141-349.000.

Scott, Ward: *See—*
McKee, Clyde M.; and Scott, Ward, 3,969,952.

Seago, James L.: *See—*
Reader, John R., Jr.; Seago, James L.; and Williamson, James A., Jr., 3,970,430.

Seanor, Donald A.: *See—*
Limburg, William W.; and Seanor, Donald A., 3,970,602.

Searle, Campbell L., to Massachusetts Institute of Technology. Auditorium simulator and the like employing different pinna filters for headphone listening. 3,970,787, Cl. 179-1.0AT.

Sears, Karl David; and Casebier, Ronald Leroy, to International Telephone and Telegraph Corporation. Etherification of bark extracts. 3,970,691, Cl. 260-507.00R.

Seidel, William C.: *See—*
Mitchell, William A.; Stahl, Howard D.; and Seidel, William C., 3,970,766.

Seifert, Kerry D.; and Smiley, Parker C., to United States of America, Air Force. Direct injection liquid propellant gun system. 3,969,978, Cl. 89-7.000.

Seifert, Peter; and Chupka, David E., to Black Clawson Company, The. Apparatus for screening paper fiber stock. 3,970,548, Cl. 209-240.000.

Sekiguchi, Sadao: *See—*
Izaki, Nobujiro; Nakayama, Masashi; Mishiba, Saburo; and Sekiguchi, Sadao, 3,970,629.

Sekiguchi, Takeshi, to Canon Kabushiki Kaisha. Highly variable magnification zoom lens system having a diaphragm with its apertures diameter varied in relation with zooming. 3,970,366, Cl. 350-184.000.

Semrow, Robert A.: *See—*
Kulig, Frank M.; Semrow, Robert A.; and Yorgensen, Harry P., Jr., 3,969,820.

Senn, Herall G. Educational game. 3,970,312, Cl. 273-130.00A.

Settepani, Joseph A.: *See—*
Mallory, Robert A.; and Settepani, Joseph A., 3,970,646.

Seyler, Gerard; and Roback, Kenneth J., to Motorola, Inc. Thick film rotary switch. 3,970,986, Cl. 338-171.000.

Seymour, Shaun A., to Sperry Rand Corporation. Hay rolling machine with improved roll starting and compression means. 3,969,879, Cl. 56-341.000.

Seymus, Herman Ernest, to Du Pont de Nemours, E. I., and Company. Fluorocarbon polymer coating compositions containing mica particles. 3,970,627, Cl. 260-29.60F.

Shamrock Golf Company: *See—*
Rogers, Kenneth A., 3,970,236.

Shamsutdinov, Ural Gilyazitdinovich; Gutin, Jury Viktorovich; and Kupriyanov, Alexandr Sergeevich. Vertical vibratory liquid filter. 3,970,564, Cl. 210-323.00R.

Shapiro, Marvin: *See—*
Ophir, David; Shapiro, Marvin; and Komusin, Bruce, 3,970,989.

Shapiro, Sidney; and Stancampiano, Charles V., to United States of America, Navy. Injection locked Josephson oscillator systems. 3,970,965, Cl. 331-107.00S.

Sharma, Raj Kumar: *See—*
Prevorsek, Dusan Ciril; Kwon, Young Doo; Sharma, Raj Kumar; and Gilliam, Edward T., 3,969,930.

Sharp Kabushiki Kaisha: *See—*
Minoura, Nobuo, 3,970,780.
Takano, Rikuo; Sumitomo, Yuji; Yamamoto, Yoichi; Makita, Tomoo; and Aiba, Masahiko, 3,971,039.

Shaw, Garrett D.; and Williamson, Clyde E., to TRW Inc. Drill module for borehole stress measuring instrument. 3,969,929, Cl. 73-88.00E.

Sheem, Sang K.: *See—*
Wang, Shyh; and Sheem, Sang K., 3,970,959.

Sheetz, George A., to Kline, Larry Harold. Reel with interchangeable parts. 3,970,267, Cl. 242-115.000.

Sheetz, George A., to Kline, Larry Harold. Reel comprising reel halves. 3,970,268, Cl. 242-115.000.

Sheffield, David John: *See—*
Jeal, Harvey Philip; and Sheffield, David John, 3,970,225.

Shell, James Allen, to Owens-Illinois, Inc. Silica-free, alkali metal-free and lead-free sealing glasses. 3,970,464, Cl. 106-47.00R.

Shell Oil Company: *See—*
Davison, Sol, 3,970,771.

Shelton, Dothan L., to Syllographic Machines, Inc. Syllabic typewriter. 3,970,185, Cl. 197-9.000.

Sheppard, Richard H. Axle mounting of integral power steering gear. 3,970,166, Cl. 180-163.000.

Shettel, Don L., to Hydromation Filter Company. Liquid treating method and apparatus. 3,970,536, Cl. 204-180.00R.

Shiba, Keisuke; Hinata, Masanao; Sato, Akira; Ogawa, Akira; and Kato, Hirotetu, to Fuji Photo Film Co., Ltd. Fogged, direct-positive silver halide emulsion containing carbocyanine dye having indolenine nucleus. 3,970,461, Cl. 96-101.000.

Shibata, Kosho: *See—*
Kinuhata, Koji; Amano, Kitsutaro; Sasaki, Hiroshi; Yamamoto, Hideo; Shibata, Kosho; and Yamada, Kazuo, 3,970,776.

Shigeyasu, Motoo; and Kuki, Michio, to Matsuyama Petrochemicals Inc. Process for producing aromatic carboxylic acid. 3,970,696, Cl. 260-524.00R.

Shim, Kyung Sup: *See—*
Walsh, Edward N.; and Shim, Kyung Sup, 3,970,729.

Shimizu, Shinkichi: *See—*
Shiraishi, Tatsuo; Kishiwada, Susumu; Shimizu, Shinkichi; Honmaru, Shigern; Ichihashi, Hiroshi; and Nagaoka, Yoshihiko, 3,970,702.
Shiraishi, Tatsuo; Fukusen, Hiroshi; Oishi, Sachio; Shimizu, Shinkichi; Nishikawa, Hiroyuki; and Wakabayashi, Tetsu, 3,970,739.

Shinnar, Reuel; Snyder, Paul W., Jr.; and Weekman, Vern W., Jr., to Mobil Oil Corporation. Combustion regeneration of hydrocarbon conversion catalyst with recycle of high temperature regenerated catalyst. 3,970,587, Cl. 252-417.000.

Shiokawa, Kozo: *See—*
Kishino, Shigeo; Kudamatsu, Akio; Sumi, Shozo; and Shiokawa, Kozo, 3,970,728.

Shipman, William A. Combination windshield washer/wiper. 3,969,783, Cl. 15-250.040.

Shiraishi, Tatsuo; Kishiwada, Susumu; Shimizu, Shinkichi; Honmaru, Shigern; Ichihashi, Hiroshi; and Nagaoka, Yoshihiko, to Sumitomo Chemical Company, Limited. Catalytic process for the preparation of acrolein. 3,970,702, Cl. 260-604.00R.

Shiraishi, Tatsuo; Fukusen, Hiroshi; Oishi, Sachio; Shimizu, Shinkichi; Nishikawa, Hiroyuki; and Wakabayashi, Tetsu, to Sumitomo Chemical Company, Limited. Process for concurrently treating process waste waters and flue gases from ammonia synthesis process plants. 3,970,739, Cl. 423-23.00S.

Shirn, George A., to Sprague Electric Company. Solid electrolytic capacitor with embedded counterelectrode. 3,970,903, Cl. 317-230.000.

Shoberg, Ralph S., to GSE, Inc. Load cell. 3,969,935, Cl. 73-141.00A.

Short, Oliver Alton: *See—*
Hoffman, Lewis Charles; McMunn, Charles William; Mones, Arthur Harvey; and Short, Oliver Alton, 3,970,590.

Shoup, Stephen G., to Caterpillar Tractor Co. Impingement baffle equipped oil filter. 3,970,557, Cl. 210-130.000.

Showa Denko Kabushiki Kaisha: *See—*
Takahashi, Akira; Kojima, Hiroo; Ogawa, Masao; Osuka, Hiroshi; and Kobayashi, Shoichi, 3,970,718.

Shuman, Richard F.: *See—*
Tull, Roger J.; Czaja, Robert F.; Shuman, Richard F.; and Pines, Seemon H., 3,970,693.

Shvedov, Vasily Ivanovich; Grinev, Alexei Nikolaevich; and Sytina, Evgenia Nikolaevna. Method for preparing 3,5,3′,5′-tetrabromo-2,4,2′,4′-tetraoxydiphenyl. 3,970,707, Cl. 260-620.000.

Siciliano, Anthony J.: *See—*
Peppler, William S.; Keen, Everett M.; and Siciliano, Anthony J., 3,970,044.

Siddall, John B.: *See—*
Henrick, Clive A.; and Siddall, John B., 3,970,704.

Sidlauskas, David P.: *See—*
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Siegel, William J.: *See—*
Litt, Kenneth C.; and Siegel, William J., 3,970,234.

Siemens Aktiengesellschaft: *See—*
Boroffka, Hartmut; Krimmel, Eberhard; and Runge, Hartmut, 3,970,854.
Braunbeck, Werner, 3,970,800.
Drews, Wolf-Dietrich, 3,970,250.
Geyer, Hans; Rotter, Christoph; and Welsch, Wolfgang, 3,970,363.
Grieger, Gerhard; and Bohrdt, Joaquin, 3,969,985.
Hacke, Hans-Jurgen; and Graf, Robert, 3,969,815.
Helmrich, Hans; and Guntersdorfer, Max, 3,970,184.
Heynisch, Hinrich; Meyerer, Paul; and Wolfram, Roland, 3,970,891.
Itschner, Bruno, 3,970,832.
Kersten, Ralf; Mahlein, Hans; and Oberbacher, Rudolf, 3,970,360.
Kuhn, Klaus Roland; and Stigler, Viktor, 3,970,872.
Lenz, Karl-Ludwig, 3,971,022.
Neufang, Karlheinz, 3,970,794.
Salzmann, Theodor; Wesselak, Franz; and Timpe, Wolfgang, 3,970,914.
Trattner, Hermann, 3,970,888.
Weissberger, Gunther, 3,970,977.

Siemens-Albis AG: *See—*
Gyurki, Karoly, 3,970,796.

Sievers, Robert E.; and Brooks, Joseph J. Separation of compounds differing in isotopic composition. 3,970,561, Cl. 210-198.00C.

Sigh, Jack F.: *See—*
Kolb, William A.; and Sigh, Jack F., 3,970,446.

Signal Science, Inc.: *See—*
Kolm, Eric A., 3,970,987.

Signetics Corporation: *See—*
Russell, Lewis K., 3,970,865.

Signouret, Jean Baptiste: *See—*
Garrigues, Claude; Signouret, Jean Baptiste; and Chambu, Claude, 3,970,468.

Silec-Semi-Conducteurs: *See—*
Dumas, Guy H., 3,970,843.

Sillion, Bernard: *See—*
Cohen, Choua; Durif Varambon, Durif; Salle, Robert; and Sillion, Bernard, 3,970,630.

Silveyra, Salvador, to Aislantes Leon, S.A. Mold assembly for producing multi-partitioned containers having metal connectors through the partitions. 3,970,279, Cl. 249-96.000.

Simmons, Ryden R., Sr. Telephone service control device. 3,970,789, Cl. 179-1.0HS.

Simon-Barron Limited: *See—*
Poulton, Barrie Armstrong; and Bayne, Robert Paton, 3,970,123.

Simon, Donald: *See—*
Widen, Randy Miles; and Simon, Donald, 3,969,824.

Sims, Edward M.: *See—*
Gerhardt, Lester A.; Corby, Nelson R., Jr.; and Sims, Edward M., 3,971,068.

Sindelar, Frank J.; and Greenfield, Howard J. Surgical retractor anchor apparatus. 3,970,075, Cl. 128-20.000.

Singer, Alfred Richard Eric, to National Research Development Corporation. Spraying atomized particles. 3,970,249, Cl. 239-102.000.

Singer Company, The: *See—*
Coulombe, Lionel J.; and Giaimo, Anthony, 3,970,019.

Singer, Michael: *See—*
Gazzard, Edward George; and Singer, Michael, 3,970,755.

Sinnock, Pomeroy; Lauer, Joseph Robert; Manthei, David H.; and Rugg, Arthur C., to Amrol Corporation. Security locking of rolling shutters. 3,970,134, Cl. 160-133.000.

Sioux Steam Cleaner Corporation: *See—*
Finger, John F.; and Pachop, Merle E., 3,970,048.

Sirel, Michel; and Taille, Francois, to Les Cables de Lyon. Device for the electrical protection of a coaxial cable by two connected circuits. 3,970,969, Cl. 333-12.000.

Skala, Stephen F. Ink drop printer with traversing orifice band. 3,971,040, Cl. 346-75.000.

SKF Compagnie d'Applications Mecaniques: *See—*
Zarka, Joseph, 3,969,928.

SKF Industrial Trading and Development Company, B.V.: *See—*
Santen, Sven; and Grip, Carl Erik, 3,970,290.
Van Nederveen, Hans Bertil, 3,970,517.

SKF Trading and Development Co. B.V.: *See—*
Garrett, Roy Peter; and Parkins, Derek Ray, 3,970,177.

Skuballa, Werner: *See—*
Raduchel, Bernd; Skuballa, Werner; and Vorbruggen, Helmut, 3,970,692.

Skuthan, Erich: *See—*
Maurer, Werner; and Skuthan, Erich, 3,969,989.

Slaats, Mathew A.; and Overton, David E., to Kimball International, Inc. Method of molding rigid foamed polyurethane articles. 3,970,732, Cl. 264-40.500.

Sly, Thomas L., to Anaren Microwave, Incorporated. Signal modulator apparatus. 3,970,968, Cl. 332-37.00D.

Smadja, Rene: *See—*
Goyer, Andre; and Smadja, Rene, 3,970,403.

Smale, Charles H.; and Pyne, James A., Jr., to General Motors Corporation. Cooled exhaust duct. 3,970,252, Cl. 239-127.300.

Small, Marvin: *See—*
Spitzer, Joseph George; Small, Marvin; Osipow, Lloyd I.; and Marra, Dorothea C., 3,970,219.

Smiley, Parker C.: *See—*
Seifert, Kerry D.; and Smiley, Parker C., 3,969,978.

Smith, Carl E., Jr. Hockey game. 3,970,306, Cl. 273-85.00F.

Smith, Donald H.: *See—*
Meadows, James L.; Smith, Donald H.; Ellington, Gordon H.; Mitchell, William O.; and Frost, W. Wade, 3,970,021.

Smith, Donald O.; and Judge, John S., to Micro-Bit Corporation. Micro-structure field emission electron source. 3,970,887, Cl. 313-309.000.

Smith, Donald W.: *See—*
Swisher, George William, Jr.; Smith, Donald W.; and Phillips, John F., 3,970,405.

Smith Kline & French Laboratories Limited: *See—*
Durant, Graham John, 3,970,753.

Smith, Marion Joseph. Artificial tree. 3,970,834, Cl. 240-10.00Q.

Smith, Oak Birchard: *See—*
Wenger, La Von Gene; Osterhaus, Elmer John; and Smith, Oak Birchard, 3,970,761.

Smith, Willis R.: *See—*
Auer, John H.; and Smith, Willis R., 3,970,271.

SmithKline Corporation: *See—*
Whitecar, Alten E., 3,970,120.

Smorenburg, Johannes Jacobus, to Stork Brabant, B.V. Poultry processing equipment. 3,969,790, Cl. 17-11.10R.

Smorenburg, Johannes Jacobus, to Stork-Amsterdam, B.V. Carrier element for a hydrastatic cooker. 3,970,188, Cl. 198-30.000.

Snapp, Thomas C., Jr.; Blood, Alden E.; and Johnson, Sam H., Jr., to Eastman Kodak Company. Polymeric hydroxylated polyesterethers and polyurethane flexible foam prepared therefrom. 3,970,619, Cl. 260-2.5AN.

Snow, Wilford W.: *See—*
Brown, Ralph A.; and Snow, Wilford W., 3,970,262.

Snyder, Paul W., Jr.: *See—*
Shinnar, Reuel; Snyder, Paul W., Jr.; and Weekman, Vern W., Jr., 3,970,587.

Societa Italiana Elettronica S.p.A.: *See—*
Banfi, Antonio, 3,970,873.

Societe Anonyme des Ateliers de Secheron: *See—*
Rohr, Andre, 3,970,901.

S.A. Etablissements Francois Salomon & Fils: *See—*
Salomon, Georges Pierre Joseph, 3,970,326.

Societe Anonyme Francaise du Ferodo: *See—*
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Societe Anonyme Roure Bertrand DuPont: *See—*
Plattier, Marcel; and Teisseire, Paul Jose, 3,970,682.

Societe Anonyme: SABLA: *See—*
Del Puppo, Louis, 3,970,205.
"Societe de Prayon": *See—*
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Societe Nationale des Petroles d'Aquitaine: *See—*
Garrigues, Claude; Signouret, Jean Baptiste; and Chambu, Claude, 3,970,468.
Societe Nationale des Poudres et Explosifs: *See—*
Doin, Bernard J.; Plantif, Bernard E.; and Tillac, Jean-Francois, 3,970,266.
Societe Nationale des Poudres et Expolsifs, Antar Petroles de l'Atlantique: Antargaz: *See—*
Rat, Roger M.; Pollozec, Francois A.; and Patouillet, Jean J., 3,970,511.
Sohl, Gordon; Mitrovich, Svetislav; and Staples, Ernest L., to Xerox Corporation. Damper for a composite print wheel. 3,970,186, Cl. 197-54.000.
Sokolovsky, Mordechai; Freeman, Amihay; and Goldstein, Leon. Novel substituted polyamides and process for producing them. 3,970,597, Cl. 260-72.00N.
Sola Basic Industries, Inc.: *See—*
Borkovitz, Henry S.; and Peterson, Wesley G., 3,971,007.
Solid State Technology, Inc.: *See—*
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Sony Corporation: *See—*
Arai, Michio, 3,971,055.
Hanai, Ichiro; Kobayashi, Toshiharu; and Takahashi, Kazuo, 3,971,069.
Hanai, Ichiro; Kobayashi, Toshiharu; and Takahashi, Kazuo, 3,971,070.
Hanaoka, Akio; and Yoshimochi, Ken, 3,969,831.
Horichi, Tetsuya, 3,970,870.
Matsushita, Takeshi; Hayashi, Hisao; and Kawana, Yoshiyuki, 3,971,061.
Takahashi, Shigenori, 3,970,779.
Urayama, Kiyoshi, 3,971,071.
Sopko, John F., to PPG Industries, Inc. Coating composition vaporizer. 3,970,037, Cl. 118-48.000.
Sorensen, Boyd W.: *See—*
Boothroyd, William A.; and Sorensen, Boyd W., 3,970,992.
Southard, Robert Keith: *See—*
Hopkins, John Root; Renn, Robert Maurice; and Southard, Robert Keith, 3,970,354.
Southwest Wheel and Manufacturing Company: *See—*
Boswank, Stuart E.; Jones, Robert H.; and Whaley, Newton P., 3,970,098.
Sovia, Cedric C.; and Krengel, Kenneth W. Catamaran. 3,970,025, Cl. 114-61.000.
Spaeder, Gerald J., to United States Steel Corporation. Normalized alloy steel for use at elevated temperature. 3,970,483, Cl. 148-36.000.
Spears, Cecil Julius. Collapsible tube squeezing device. 3,970,220, Cl. 222-102.000.
Speed Systems, Inc.: *See—*
Maytham, Walter J., 3,969,818.
Speggiorin, Mariano; and Wiedemann, Friedrich, to J. Bobst & Fils S.A. Apparatus for stacking folded boxes. 3,970,202, Cl. 214-6.500.
Spellman, Gordon B.: *See—*
Jaskolski, Stanley V.; Lade, Robert W.; Schutten, Herman P.; Spellman, Gordon B.; and Van Horn, Lawrence E., 3,971,056.
Spencer, George R.: *See—*
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Brown, Ralph A.; and Snow, Wilford W., 3,970,262.
Isbister, Eric J.; and O'Sullivan, James P., 3,971,018.
Korowitz, Simon, 3,971,014.
Lodi, Robert J., 3,971,001.
Seymour, Shaun A., 3,969,879.
Spierings, Ferdinand Hubert Franciscus Gerardus. Hall-voltage device. 3,970,922, Cl. 324-45.000.
Spinner GmbH, Elektrotechnische Fabrik: *See—*
Pitschi, Franz, 3,970,355.
Spitalul Clinic Filantropia Bucuresti: *See—*
Mogos, Ion; Ionescu, Cornel; Angelescu, Dionisie; Dumitrescu, Nicolae; Andreescu, Millo; Neascu, Constantin; Brozici, Mircea; Birzanescu, Mihai; Puie, Alexandru; and Vasilica, Gheorghe, 3,970,074.
Spitzer, Joseph George; Small, Marvin; Osipow, Lloyd I.; and Marra, Dorothea C. Aerosol containers for foaming and delivering aerosols and process. 3,970,219, Cl. 222-1.000.
Sponberg, Gerald E., to Sponberg, Gerald E. Tractor foot pedal guide. 3,969,953, Cl. 74-560.000.
Sponseller, John R.: *See—*
McNenney, William; and Sponseller, John R., 3,970,261.
Sprague Electric Company: *See—*
Shirn, George A., 3,970,903.
Spranger, Douglas M.: *See—*
Benham, Edward Edmund; Menn, Walter A.; Spranger, Douglas M.; and Brookes, Malcolm J., 3,970,792.
Square D Company: *See—*
Davies, Terrence Ardern, 3,970,451.
Stahl, Howard D.: *See—*
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Staib, Helmut: *See—*
Brune, Gerhard; Staib, Helmut; Kochendorfer, Heinrich; Hans, Waldemar; Ropstorff, Walter; Leiber, Heinz; and Kirstein, Lothar, 3,970,111.
Stalley, Anthony Donald: *See—*
Michael, Peter Colin; and Stalley, Anthony Donald, 3,971,063.
Stamicarbon B.V.: *See—*
Verstegen, Johannes D. M., 3,970,742.
Stancampiano, Charles V.: *See—*
Shapiro, Sidney; and Stancampiano, Charles V., 3,970,965.
Standard Oil Company: *See—*
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Jezl, James L.; and Peters, Edwin F., 3,970,611.
Jones, Loyd W.; and Holman, George B., 3,970,148.
Standard Products Company, The: *See—*
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Stanford Research Institute: *See—*
Anbar, Michael; McMillen, Donald F.; Weaver, Robert D.; and Jorgensen, Paul J., 3,970,474.
Wise, Henry, 3,970,431.
Stangeland, Maynard L., to Rockwell International Corporation. Internal thrust reverser. 3,970,030, Cl. 115-12.00R.
Stanton, Arthur J., to Harris Corporation. Densitometer head with fiber optics. 3,970,394, Cl. 356-195.000.
Staples, Ernest L.: *See—*
Sohl, Gordon; Mitrovich, Svetislav; and Staples, Ernest L., 3,970,186.
Stark, Carroll G., to Anemostat Products Division Dynamics Corporation of America. Tamper-proof window unit. 3,969,857, Cl. 52-208.000.
Stark, Sven Olof Soren; Rauser, Jan Axel Ingemar; and Rauser, Irma Marita, to Deering Milliken Research Corporation. Method and apparatus for the presterilization of packing machines. 3,970,426, Cl. 21-54.00R.
Starkweather, Gary K., to Xerox Corporation. Flying spot flat field scanner. 3,970,359, Cl. 350-7.000.
Stauffer Chemical Company: *See—*
Pallos, Ferenc M.; Lee, Hwalin; and Menn, Julius J., 3,970,758.
Walsh, Edward N.; and Shim, Kyung Sup, 3,970,729.
Stecher, Friedhelm; Fazekas, Josef; Johren, Paul; and Morsbach, Martin, to Goetzewerke-Friedrich Goetze AG. Cylinder head gasket for internal-combustion engine. 3,970,322, Cl. 277-235.00A.
Steffensen, John, to McGraw-Edison Company. Rechargeable battery with zinc negative and dendrite barrier. 3,970,472, Cl. 136-3.000.
Steinhart, Gilbert; and Bock, Heinrich, to Nabisco, Inc. Conveyor system for manufactured articles, particularly confections. 3,970,189, Cl. 198-34.000.
Stephenson, Fred J.; and Rush, Donald J., to Butler Manufacturing Company. Fire resistant ceiling construction. 3,969,864, Cl. 52-475.000.
Stephenson, Robert L., to Allied Chemical Corporation. Safety belt buckle. 3,969,795, Cl. 24-203.0AL.
Sterling Drug Inc.: *See—*
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Stern, Howard K.: *See—*
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Stern, Morton: *See—*
Bates, Wayne J.; Berenson, Walter L.; Euchner, William H., Jr.; Grigg, James H.; Stern, Morton; and Taylor, Ronald W., 3,970,937.
Sternbach, Leo Henryk; and Walser, Armin, to Hoffmann-La Roche Inc. Preparation of triazolo benzodiazepines. 3,970,664, Cl. 260-296.00T.
Stettler, Richard J.; and Verdouw, Albert T., to General Motors Corporation. Combustion system. 3,969,892, Cl. 60-39.51R.
Stevenin, Jean: *See—*
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Stewart, Daniel R.: *See—*
Planchock, Jerry L.; Stewart, Daniel R.; and Brock, Thomas W., 3,970,463.
Stewart, William H., Jr., to Deering Milliken Research Corporation. Dyeing and printing of materials. 3,969,779, Cl. 8-149.000.
Stigler, Viktor: *See—*
Kuhn, Klaus Roland; and Stigler, Viktor, 3,970,872.
Stillman, Neil W., to Diamond Shamrock Corporation. Self setting molding process. 3,970,462, Cl. 106-38.350.
Stobb, Anton R., to Stobb, Inc. Separator for a sheet stacker. 3,969,993, Cl. 93-93.00C.
Stobb, Inc.: *See—*
Stobb, Anton R., 3,969,993.
Stoffelsma, Jan; and Pypker, Jacob, to Polak's Frutal Works B.V.; and Douwe Egberts Koninklijke Tabaksfabriek-Koffiebranderijen-Theehandel N.V. Mercapto alcohols and mercaptoalkyl esters. 3,970,689, Cl. 260-488.00F.
Stolberg, Hermann-Josef: *See—*
Uerlichs, Johannes; Muller, Rudolf; and Stolberg, Hermann-Josef, 3,970,109.
Stolz, Heinrich: *See—*
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Stoneman, Estel McKinley: *See—*
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Stonner, Hans-Martin; Scholtz, Berthold; and Hartmann, Rainer, to Metallgesellschaft Aktiengesellschaft. Multistage vertical extractor for liquid-liquid counterflow extraction. 3,970,432, Cl. 23-270.50T.

Stopper, Herbert: *See—*
Allen, William W.; and Stopper, Herbert, 3,970,876.

Storey, Robert C.: *See—*
Olson, James R.; and Storey, Robert C., 3,970,571.

Stork-Amsterdam, B.V.: *See—*
Smorenburg, Johannes Jacobus, 3,970,188.

Stork Brabant, B.V.: *See—*
Smorenburg, Johannes Jacobus, 3,969,790.

Stork, Gilbert J.: *See—*
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Stotz & Co. AG: *See—*
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Stowell Industries Inc.: *See—*
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Strand Century Incorporated: *See—*
Bryant, Doyle D., 3,970,893.

Stratford Engineering Corporation: *See—*
West, Charles L., 3,970,720.

Stratmann, Josef: *See—*
Bender, Martin; Knappstein, Johannes; and Stratmann, Josef, 3,970,526.

Streifer, William; Scifres, Donald R.; and Burnham, Robert D., to Xerox Corporation. Electrically pumped, solid-state distributed feedback laser with particular grating spacing. 3,970,958, Cl. 331-94.50C.

Strickland, Robert Walter: *See—*
Minetti, Richard Henry; and Strickland, Robert Walter, 3,969,813.

Stricon Products Limited: *See—*
Marsden, Ronald Eric; Webb, Franklyn Walter; and Rukavina, George, 3,969,920.

Stroik, Edward R., to Tudor Technology, Inc. Thermocouple. 3,970,481, Cl. 136-230.000.

Stromberg-Carlson Corporation: *See—*
Randmere, Uno, 3,970,786.

Structural Stoneware Incorporated: *See—*
Whitacre, Daniel C., 3,969,851.

Strutz, Hans-Jurgen; and Jacob, Ingolf, to Hoechst Aktiengesellschaft. Method and device for starting up injector nozzles. 3,970,231, Cl. 226-7.000.

Studer, Altee C. Jack stand. 3,970,278, Cl. 248-352.000.

Sturwold, Robert J.; and Barrett, Fred O., to Emery Industries, Inc. Water soluble triglyceride compositions and method for their preparation. 3,970,569, Cl. 252-49.300.

Suchecki, Josef. Machine and a method for fabricating a helicoidal tube. 3,970,233, Cl. 228-17.500.

Suchko, Adam John, to RCA Corporation. Fault detector and interrupt circuit useful in a television signal processing system. 3,970,915, Cl. 321-21.000.

Sud-Chemie AG: *See—*
Friese, Hermann, 3,970,712.

Sugio, Akitoshi: *See—*
Yonemitsu, Eiichi; Sugio, Akitoshi; Kawaki, Takao; Konishi, Akihiko; and Mizutani, Zempei, 3,970,640.

Sugishita, Akio: *See—*
Fujiwara, Hiroshi; Asano, Koichi; Sugishita, Akio; and Takahashi, Asao, 3,970,534.

Sugiura, Susumu: *See—*
Yamamoto, Eisuke; Sugiura, Susumu; and Sawamura, Osamu, 3,970,384.

Sukman, Edwin L.; and Touval, Irving, to M & T Chemicals Inc. Flame retardant compositions derived from difunctional carboxylic acids containing a halogenated thiophere ring and methods for their preparation. 3,970,598, Cl. 260-75.00S.

Sulzer Brothers Limited: *See—*
Aguet, Emile, 3,969,891.

Sumi, Shozo: *See—*
Kishino, Shigeo; Kudamatsu, Akio; Sumi, Shozo; and Shiokawa, Kozo, 3,970,728.

Sumitomo Chemical Company, Limited: *See—*
Kishikawa, Hiroshi; Adachi, Takayoshi; and Usami, Tamio, 3,970,863.
Kitamura, Shigeyoshi; Okuno, Yositosi; and Hirano, Masachika, 3,970,703.
Minai, Masayoshi; Suzuki, Yoshio; Hamma, Noritaka; Murayama, Eiichi; and Aono, Shunji, 3,970,694.
Nagase, Tsuneyuki; Suzukamo, Gohu; and Suzuki, Yoshio, 3,970,700.
Shiraishi, Tatsuo; Kishiwada, Susumu; Shimizu, Shinkichi; Honmaru, Shigern; Ichihashi, Hiroshi; and Nagaoka, Yoshihiko, 3,970,702.
Shiraishi, Tatsuo; Fukusen, Hiroshi; Oishi, Sachio; Shimizu, Shinkichi; Nishikawa, Hiroyuki; and Wakabayashi, Tetsu, 3,970,739.
Yamamoto, Michihiro; Morooka, Shigeaki; Koshiba, Masao; Inaba, Shigeho; and Yamamoto, Hisao, 3,970,654.

Sumitomo Electric Industries, Ltd.: *See—*
Ito, Hiroshi, 3,970,921.
Kumon, Osamu, 3,970,879.
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Sumitomo Naugatuck Co., Ltd.: *See—*
Izaki, Nobujiro; Nakayama, Masashi; Mishiba, Saburo; and Sekiguchi, Sadao, 3,970,629.

Sumitomo, Yuji: *See—*
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Sun Oil Company of Pennsylvania: *See—*
Keenan, Bernard J., Jr., 3,970,146.
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Sun Ventures, Inc.: *See—*
Schneider, Abraham; Wood, Stanley E.; and Bryant, James T., 3,969,979.

Sundstrand Corporation: *See—*
Louis, Joseph E., 3,969,896.

Sundt, Cornelius V., to United Technologies Corporation. Closed channel disk for a gas turbine engine. 3,970,412, Cl. 416-219.00R.

Surgical Appliance Industries, Inc.: *See—*
Applegate, Leslie T., Jr., 3,970,081.

Susi, Peter Vincent: *See—*
Hardy, William Baptist; and Susi, Peter Vincent, 3,970,636.

Sutcliffe, Henry; and Ball, Edward, to Penelopegay Rowland Absalom. Method and apparatus for exciting the driving coils of audible warning devices. 3,971,017, Cl. 340-384.00E.

Suter, Xaver, to Werkzeugmaschinenfabrik Oerlikon-Buhrle. Spinning projectile. 3,970,004, Cl. 102-56.0SC.

Suzukamo, Gohu: *See—*
Nagase, Tsuneyuki; Suzukamo, Gohu; and Suzuki, Yoshio, 3,970,700.

Suzuki, Keisuke, to Yamaha Hatsudoki Kabushiki Kaisha. Small-sized snowmobile. 3,970,164, Cl. 180-68.00R.

Suzuki, Shigeyuki; Yamauchi, Akira; Kiyama, Shoji; and Yamaki, Kiyoshi, to Kureha Kagaku Kogyo Kabushiki Kaisha. Method for preparing dispersing agent. 3,970,690, Cl. 260-505.00C.

Suzuki, Takeshi; Takenaka, Shigeo; Tanaka, Hiroshi; and Akiyama, Masanori, to Tokyo Shibaura Electric Co., Ltd. Apparatus for making electroluminescent screens for color cathode ray tubes. 3,971,043, Cl. 354-1.000.

Suzuki, Toshio: *See—*
Takizawa, Jun; Oshima, Kazuyuki; Yamamoto, Hikaru; Kuribayashi, Kooji; and Suzuki, Toshio, 3,969,807.

Suzuki, Yasuo: *See—*
Anahara, Meiji; Kawasaki, Yukio; and Suzuki, Yasuo, 3,969,885.

Suzuki, Yoshio: *See—*
Minai, Masayoshi; Suzuki, Yoshio; Hamma, Noritaka; Murayama, Eiichi; and Aono, Shunji, 3,970,694.
Nagase, Tsuneyuki; Suzukamo, Gohu; and Suzuki, Yoshio, 3,970,700.

Svenska Aktiebolaget Bromsregulator: *See—*
Sander, Nils Borje Lennart, 3,970,173.

Svenska Dataregister AB: *See—*
Englund, G. Roland, 3,969,945.

Swafford, Clifton S.; Caldwell, Thurman T.; and Dungan, William J., to Rexham Corporation. Hosiery envelope. 3,970,242, Cl. 229-80.000.

Swandiak, Steve, to Artcraft Wire Goods, Inc. Display rack hook. 3,970,275, Cl. 248-223.000.

Sweet, David L.: *See—*
Sweet, Philip J.; Hamlet, Buck C.; and Sweet, David L., 3,970,293.

Sweet, Philip J.; Hamlet, Buck C.; and Sweet, David L., to American Carrier Equipment. Suspension system. 3,970,293, Cl. 267-31.000.

Swengel, Robert Charles, Sr.; Lemke, Timothy Allen; and Villiard, Frederick Phillip, to AMP Incorporated. Bonded wire interconnection system. 3,969,816, Cl. 29-625.000.

Swift, Harold E.: *See—*
Taylor, Brian W.; and Swift, Harold E., 3,970,705.

Swift, Howard R.; and Livingston, Kenneth C., to Libbey-Owens-Ford Company. Transparent grand piano tops. 3,969,970, Cl. 84-177.000.

Swisher, George William, Jr.; Smith, Donald W.; and Phillips, John F., to CMI Corporation. Slipform paving apparatus. 3,970,405, Cl. 404-105.000.

Swodenk, Wolfgang: *See—*
Scharfe, Gerhard; Schwerdtel, Wulf; Swodenk, Wolfgang; Engelhard, Bruno; Grolig, Johann; Martin, Manfred; and Reissinger, Karl-Hermann, 3,970,713.

Syllographic Machines, Inc.: *See—*
Shelton, Dothan L., 3,970,185.

Sylten, Hans D., to Holcomb, Jack N. Method and apparatus for determining motion and speed. 3,970,938, Cl. 325-117.000.

Syntex (U.S.A.) Inc.: *See—*
Crabbe, Pierre; Fried, John H.; and Guzman, Angel, 3,970,684.
Untch, Karl G.; and Stork, Gilbert J., 3,970,685.

Sytina, Evgenia Nikolaevna: *See—*
Shvedov, Vasily Ivanovich; Grinev, Alexei Nikolaevich; and Sytina, Evgenia Nikolaevna, 3,970,707.

Taft, Kenneth E., to Lawrence Peska Associates, Inc., a part interest. Hinge pin locks. 3,970,340, Cl. 292-300.000.

Taggart, Robert B. Parabolic reflector assembled from triangular shaped petals. 3,971,023, Cl. 343-840.000.

Taille, Francois: *See—*
Sirel, Michel; and Taille, Francois, 3,970,969.

Takada, Juichiro, legal authorized heir: *See—*
Takada, Takezo, deceased; and Takada, Juichiro, legal authorized heir, 3,970,116.

Takada, Takezo, deceased; and by Takada, Juichiro, legal authorized heir. Method of weaving a composite tube and web and resulting article. 3,970,116, Cl. 139-387.00R.

Takagi, Katsuhide; and Fukasawa, Toshiro, to Sankyo Kogaku Kogyo Kabushiki-Kaisha. Movie camera capable of magnetic recording simultaneously with filming. 3,970,378, Cl. 352-30.000.

Takagi, Sadao: *See—*
Yasaka, Toshio; Ito, Ryuzo; and Takagi, Sadao, 3,970,996.
Takahashi, Akira; Kojima, Hiroo; Ogawa, Masao; Osuka, Hiroshi; and Kobayashi, Shoichi, to Showa Denko Kabushiki Kaisha. Method of producing polymer compositions based on chlorinated polyethylene. 3,970,718, Cl. 260-876.00R.
Takahashi, Asao: *See—*
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Takahashi, Kazuo: *See—*
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Hanai, Ichiro; Kobayashi, Toshiharu; and Takahashi, Kazuo, 3,971,070.
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Takahashi, Shigenori, to Sony Corporation. Power supply circuit. 3,970,779, Cl. 178-7.30R.
Takahashi, Tooru, to Yamaichi Denki Kogyo Kabushiki Kaisha. Matrix pin board. 3,970,350, Cl. 339-18.00P.
Takahata, Kouichi: *See—*
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Okuno, Keno; and Takahata, Kouichi, 3,971,050.
Takama, Kazushi: *See—*
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Takano, Rikuo; Sumitomo, Yuji; Yamamoto, Yoichi; Makita, Tomoo; and Aiba, Masahiko, to Nippon Telegraph and Telephone Public Corporation; and Sharp Kabushiki Kaisha. Ink jet system printer with temperature compensation. 3,971,039, Cl. 346-75.000.
Takasago Perfumery Co., Ltd.: *See—*
Nagakura, Akira; Akutagawa, Susumu; and Kurihara, Haruki, 3,970,593.
Takatori Machinery Works Ltd.: *See—*
Fukuyama, Yoshinobu, 3,970,015.
Takeda Chemical Industries, Ltd.: *See—*
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Takeda Riken Kogyo Kabushiki Kaisha: *See—*
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Takenaka, Shigeo: *See—*
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Taketa, Tsuneyoshi: *See—*
Matsui, Goro; Toda, Koji; Horiishi, Nanao; Wakimoto, Kazuyoshi; Nishiyama, Yoshifumi; Taketa, Tsuneyoshi; and Takama, Kazushi, 3,970,738.
Takeuchi, Norio, to Director-General of the Agency of Industrial Science and Technology. Method for producing hydrogen from water. 3,970,745, Cl. 423-657.000.
Takizawa, Jun; Oshima, Kazuyuki; Yamamoto, Hikaru; Kuribayashi, Kooji; and Suzuki, Toshio, to Nippon Telegraph and Telephone Public Corporation; Fujikura Cable Works, Ltd., The; Furukawa Electric Co., Ltd., The; and Sumitomo Electric Industries, Ltd. Core wire-connecting device. 3,969,807, Cl. 29-203.0DT.
Tamir, David; and Erlicki, Michael S., to Technion Research and Development Foundation Ltd. Detector and apparatus incorporating the same for detecting phase-asymmetry and protecting three-phase motors against dangerous operating conditions. 3,970,897, Cl. 317-13.00R.
Tanaka, Hiroshi: *See—*
Suzuki, Takeshi; Takenaka, Shigeo; Tanaka, Hiroshi; and Akiyama, Masanori, 3,971,043.
Tani, Tadaaki, to Fuji Photo Film Co., Ltd. Process for developing a direct reversal silver halide photographic light-sensitive material. 3,970,459, Cl. 96-64.000.
Taniguchi, Takuzo: *See—*
Kano, Saburo; Nomura, Osami; Asada, Mitsuo; Ando, Meiki; Matsuda, Michihiko; Yamada, Tomio; Watanabe, Hitoshi; and Taniguchi, Takuzo, 3,970,751.
Tanner, Jimmy D., to Arundale, Inc. Appliance foot with secure resilient pad. 3,970,273, Cl. 248-24.000.
Tanney, John W., to Canadian Patents and Development Limited. Apparatus for measuring the velocity and/or density of a fluid stream. 3,969,938, Cl. 73-189.000.
Taylor, Brian W.; and Swift, Harold E., to B. F. Goodrich Company, The. Preparation of unsaturated ethers. 3,970,705, Cl. 260-614.00R.
Taylor, Lynn J., to Owens-Illinois, Inc. Low melting liquid-crystal mixtures. 3,970,579, Cl. 252-299.000.
Taylor, Richard H.: *See—*
Mendrin, Michael J.; and Taylor, Richard H., 3,970,389.
Taylor, Ronald W.: *See—*
Bates, Wayne J.; Berenson, Walter L.; Euchner, William H., Jr.; Grigg, James H.; Stern, Morton; and Taylor, Ronald W., 3,970,937.
Taylor, William F.; and Lieberman, Martin, to Exxon Research and Engineering Company. Catalyst for hydrazine decomposition. 3,970,588, Cl. 252-459.000.
Teague, Jimmie C.: *See—*
Kiehl, William C.; Moore, Thomas F.; and Teague, Jimmie C., 3,970,182.
Technion Research and Development Foundation Ltd.: *See—*
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Tektronix, Inc.: *See—*
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Cobb, G. Harold, 3,970,889.
Teledyne Exploration Company: *See—*
Berglund, Carl O., 3,970,878.
Tepfer, Barry. Sales slip wallet. 3,970,129, Cl. 150-39.000.
Terajima, Kazuki; Tomita, Shigeru; Matsuda, Yoshindo; and Abe, Keiji, to Director-General of the Agency of Industrial Science and Technology. Heavy metal adsorbent process. 3,970,553, Cl. 210-36.000.
Teramoto, Toyokazu: *See—*
Yamada, Takeo; Kunioka, Kazuo; and Teramoto, Toyokazu, 3,970,291.
Tessler, Martin M.; and Jarowenko, Wadym, to National Starch and Chemical Corporation. Retort starches products prepared from blends of starch and high amylose starch components. 3,970,767, Cl. 426-579.000.
Texaco Inc.: *See—*
Brockington, James W.; and Bennett, Richard H., 3,970,721.
McIntosh, Herbert A., 3,970,543.
Texas Instruments Incorporated: *See—*
Baudouin, Daniel Adrian; and Dumas, John R., 3,970,995.
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Tezuka, Shigeru: *See—*
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Th. Kieserling & Albrecht: *See—*
Goeke, Alfons, 3,969,919.
Theodore, Michael J.; Paterson, Malcolm M.; and Schrimper, Vernon L., to Raytheon Company. Air classification apparatus. 3,970,547, Cl. 209-136.000.
Thettu, Raghulinga R., to Xerox Corporation. Roll fuser. 3,970,038, Cl. 118-60.000.
Thiele, Siegfried, to Wilhelm Altendorf, Maschinenbau. Machine tool workpiece feed carriage. 3,970,127, Cl. 144-242.00R.
Thimot, George W., to Hudson Lock, Inc. Method and apparatus for handling coiled springs. 3,970,214, Cl. 221-1.000.
Thomas, Herbert: *See—*
Wollweber, Hartmund; Niemers, Ekkehard; Schulz, Hans Peter; Thomas, Herbert; and Andrews, Peter, 3,970,699.
Thomas, Robert M., to GTE Automatic Electric (Canada) Limited. Active hybrid circuit. 3,970,805, Cl. 179-170.0NC.
Thompson, Robert Clifton: *See—*
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Thomson-Brandt: *See—*
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Thomson-CSF: *See—*
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Thrash, Sammy DeWitt, to Combustion Engineering, Inc. Oil well production system. 3,970,143, Cl. 166-53.000.
Three Sisters Ranch Enterprises: *See—*
Faulstich, George W., 3,970,207.
Tillac, Jean-Francois: *See—*
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Timpe, Wolfgang: *See—*
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Toda, Kikuo, to Nippon Educational Television Company, Ltd. Special effect generation system in an image pickup system. 3,971,066, Cl. 358-55.000.
Toda Kogyo Corporation: *See—*
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Tokita, Yasuo: *See—*
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Tokyo Denki Kagaku Kogyo Kabushiki Kaisha (TDK Electronics Co., Ltd.): *See—*
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Tokyo Shibaura Electric Co., Ltd.: *See—*
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Sato, Itsuzo; and Saito, Kikuo, 3,970,947.
Suzuki, Takeshi; Takenaka, Shigeo; Tanaka, Hiroshi; and Akiyama, Masanori, 3,971,043.
Toman, Donald J., to Tull Aviation Corporation. Multiple beam glide slope radio navigation method with two classes of beams. 3,971,026, Cl. 343-108.00M.
Tomita, Shigeru: *See—*
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Tomy Kogyo Co., Inc.: *See—*
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Torii, Taketsugu; and Nishio, Minoru, to Toyota Jidosha Kogyo Kabushiki Kaisha. Window antenna device for use in motor vehicle. 3,971,029, Cl. 343-704.000.
Torlesse, Arthur Timothy: *See—*
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Towle, William C.: *See—*
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Townsend and Townsend: *See—*
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Nelson, Arthur L., 3,970,735.
Toy, Albert; Nelson, Paul T.; and Schafer, Clarence E., to TRW Inc. Method of fabricating waveguide structures. 3,969,814, Cl. 29-600.000.
Toyo Boseki KK: *See—*
Anahara, Meiji; Kawasaki, Yukio; and Suzuki, Yasuo, 3,969,885.
Toyo Boseki Kabushiki Kaisha: *See—*
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Trattner, Hermann, to Siemens Aktiengesellschaft. Tungsten-thorium dioxide-aluminum oxide mass for a high-temperature-resistant emission electrode and process for the production thereof. 3,970,888, Cl. 313-346.00R.
Trekoval, Jiri: *See—*
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Trojan, Gunter; and Bohm, Richard, to Hein, Lehmann A.G. Centrifuge. 3,970,470, Cl. 127-19.000.
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Tsuji, Sadahiko, to Canon Kabushiki Kaisha. Zoom lens system. 3,970,367, Cl. 350-184.000.
Tsuji, Yuichi: *See—*
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Tugukuni, Hideyoshi; and Kano, Masafumi, to Dai Nippon Toryo Co., Ltd. Powdery coating composition and process for preparing the same. 3,970,725, Cl. 260-901.000.
Tuley, Eugene N., to General Electric Company. Sealing means for a segmented ring. 3,970,318, Cl. 277-26.000.
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Tull, Roger J.; Czaja, Robert F.; Shuman, Richard F.; and Pines, Seemon H., to Merck & Co., Inc. Process for preparing indene acetic acids. 3,970,693, Cl. 260-515.00A.
Turek, Michael H., to Monsanto Company. Apparatus improvements for controlling parison length. 3,970,418, Cl. 425-140.000.
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Rist, Donald Hammond; and Turley, Barry Jay, 3,970,858.
Turner, Hamish. Building panel and process for manufacturing same. 3,970,502, Cl. 156-310.000.
Turos, William E., to MTD Products Inc. Combination mower and catcher. 3,969,876, Cl. 56-202.000.
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Uffman, Leroy E. Rotary cutter. 3,970,407, Cl. 408-204.000.
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Wentworth, Gary, to Monsanto Company. Method for recovering vinyl sulfonate monomers. 3,970,605, Cl. 260-79.30M.

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Frankenfeld, John W.; and Wright, Donald L., 3,970,759.
Wright, John P. Hair treatment apparatus. 3,970,094, Cl. 132-9.000.
Wright, Mynie L.; and Wright, Theodore H. Gold separator. 3,970,551, Cl. 209-458.000.
Wright Rain Limited: *See—*
Harvey, Vernon Bryan William, 3,970,102.
Wright, Theodore H.: *See—*
Wright, Mynie L.; and Wright, Theodore H., 3,970,551.
Wrob, Ronald M., to Watlow Electric Manufacturing Company. Electric cartridge heater. 3,970,822, Cl. 219-541.000.
Wu, Alexander Chiang-Hsia; and Hou, Shou Ling, to Addressograph Multigraph Corporation. Charged particle modulator device and imaging methods. 3,970,452, Cl. 96-1.00R.
Wuerker, Ralph F.: *See—*
Heflinger, Lee O.; and Wuerker, Ralph F., 3,970,390.
Wulff, Jochen: *See—*
Muller-Albrecht, Horst; Quiring, Bernd; Dollhausen, Manfred; and Wulff, Jochen, 3,970,717.
Wyman, John E.: *See—*
Nadeau, Raymond R.; and Wyman, John E., 3,970,455.
Xenex Corporation: *See—*
Schofield, George L., Jr.; and Lignell, James L., 3,970,846.
Xerox Corporation: *See—*
Belli, Frank G.; and Augostini, Peter P., 3,970,453.
Fisher, Donald H.; and Crociata, Vincent J., 3,970,382.
Meagher, Thomas; and Michatek, Robert J., 3,970,381.
Rees, James D., 3,970,042.
Ring, Howard D., 3,971,042.
Sato, Masamichi; and Tezuka, Shigeru, 3,970,043.
Sohl, Gordon; Mitrovich, Svetislav; and Staples, Ernest L., 3,970,186.
Starkweather, Gary K., 3,970,359.
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Xonics, Inc.: *See—*
Fenn, John B., Jr; and Welkowsky, Murray S., 3,970,844.
Yamada, Kazuo: *See—*
Kinuhata, Koji; Amano, Kitsutaro; Sasaki, Hiroshi; Yamamoto, Hideo; Shibata, Kosho; and Yamada, Kazuo, 3,970,776.
Yamada, Sadakazu, to Stotz & Co. AG. Reduced pressure type steam generator. 3,970,047, Cl. 122-13.00R.
Yamada, Takeo; Kunioka, Kazuo; and Teramoto, Toyokazu, to Nippon Kokan Kabushiki Kaisha. Method of preventing occurrence of pulsation in a circulating liquid for evaporative cooling. 3,970,291, Cl. 266-193.000.
Yamada, Tomio: *See—*
Kano, Saburo; Nomura, Osami; Asada, Mitsuo; Ando, Meiki; Matsuda, Michihiko; Yamada, Tomio; Watanabe, Hitoshi; and Taniguchi, Takuzo, 3,970,751.
Yamaguchi, Shunzo; Igashira, Toshihiko; and Hujita, Masami, to Nippon Soken, Inc. Ignition system for rotary piston engine. 3,970,049, Cl. 123-8.050.
Yamaha Hatsudoki Kabushiki Kaisha: *See—*
Suzuki, Keisuke, 3,970,164.
Yamaichi Denki Kogyo Kabushiki Kaisha: *See—*
Takahashi, Tooru, 3,970,350.
Yamakado, Akio: *See—*
Ichise, Yoshio; and Yamakado, Akio, 3,969,902.
Yamaki, Kiyoshi: *See—*
Suzuki, Shigeyuki; Yamauchi, Akira; Kiyama, Shoji; and Yamaki, Kiyoshi, 3,970,690.
Yamamoto, Eisuke; Sugiura, Susumu; and Sawamura, Osamu, to Canon Kabushiki Kaisha. Safety device for photocopying machine. 3,970,384, Cl. 355-14.000.
Yamamoto, Hideo: *See—*
Kinuhata, Koji; Amano, Kitsutaro; Sasaki, Hiroshi; Yamamoto, Hideo; Shibata, Kosho; and Yamada, Kazuo, 3,970,776.
Yamamoto, Hikaru: *See—*
Takizawa, Jun; Oshima, Kazuyuki; Yamamoto, Hikaru; Kuribayashi, Kooji; and Suzuki, Toshio, 3,969,807.
Yamamoto, Hisao: *See—*
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Yamamoto, Kunio: *See—*
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Yamamoto, Masahiro: *See—*
Itoh, Tsutomu; Sakurai, Munekazu; Yamamoto, Masahiro; and Okamoto, Yasunari, 3,970,905.
Yamamoto, Michihiro; Morooka, Shigeaki; Koshiba, Masao; Inaba, Shigeho; and Yamamoto, Hisao, to Sumitomo Chemical Company, Limited. Antiviral 2(1H)-quinazolinone derivatives. 3,970,654, Cl. 260-251.0QB.
Yamamoto, Yoichi: *See—*
Takano, Rikuo; Sumitomo, Yuji; Yamamoto, Yoichi; Makita, Tomoo; and Aiba, Masahiko, 3,971,039.
Yamashita, Mikio. Wedge-clamped flange joint. 3,970,402, Cl. 403-338.000.
Yamauchi, Akira: *See—*
Suzuki, Shigeyuki; Yamauchi, Akira; Kiyama, Shoji; and Yamaki, Kiyoshi, 3,970,690.
Yanikoski, Florian F., to Union Special Corporation. Automatic sewing machine. 3,970,016, Cl. 112-121.120.
Yasaka, Toshio; Ito, Ryuzo; and Takagi, Sadao, to Perfect Liberty. Apparatus for collecting medical data. 3,970,996, Cl. 340-172.500.
Yashima Chemical Engineering Co., Ltd.: *See—*
Nakai, Muneaki, 3,970,510.
Yasuda, Tooru; Kitamura, Yoshinori; and Nakabe, Ryuhei, to Matsushita Electric Industrial Co., Ltd. Deflection system. 3,970,894, Cl. 315-370.000.
Ymos-Mettalwerke: *See—*
Kretschmer, Paul, 3,970,346.
Yoda, Kazuhiro, to Kabushiki Kaisha Daini Seikosha. Digital electronic watch for displaying both time and the time remaining within a preselected time period. 3,969,886, Cl. 58-23.00R.
Yokota, Akira: *See—*
Sasajima, Ken-ichi; Doi, Muneharu; Fukuhara, Teruo; Yokota, Akira; Nakao, Yoshio; and Yoneda, Masahiko, 3,970,522.
Yoneda, Masahiko: *See—*
Sasajima, Ken-ichi; Doi, Muneharu; Fukuhara, Teruo; Yokota, Akira; Nakao, Yoshio; and Yoneda, Masahiko, 3,970,522.
Yonekura, Kanji: *See—*
Nishizaki, Hiroshi; Yonekura, Kanji; and Tsuji, Yuichi, 3,971,008.
Yonemitsu, Eiichi; Sugio, Akitoshi; Kawaki, Takao; Konishi, Akihiko; and Mizutani, Zempei, to Mitsubishi Gas Chemical Company, Inc. Process for the production of polyphenylene ethers having a desired polymerization degree. 3,970,640, Cl. 260-47.0ET.
Yoo, Jin S.; and Voss, Andrew P., to Atlantic Richfield Company. Hydrocarbon desulfurization utilizing a non-catalytic hydrogen donor step and an oxidation step. 3,970,545, Cl. 208-212.000.
Yorgensen, Harry P., Jr.: *See—*
Kulig, Frank M.; Semrow, Robert A.; and Yorgensen, Harry P., Jr., 3,969,820.
Yoshida Kogyo Kabushiki Kaisha: *See—*
Ebata, Hiroyuki, 3,969,794.
Yoshida, Masafumi; Murayama, Naohiro; and Obara, Hiroshi, to Kureha Kagaku Kogyo Kabushiki Kaisha. Vibration measuring and the apparatus therefor. 3,969,927, Cl. 73-71.400.

Yoshimochi, Ken: *See*—
Hanaoka, Akio; and Yoshimochi, Ken, 3,969,831.

Yoshimura, Takehisa, to Ruby Net Hosoki Kabushiki Kaisha. Method of manufacturing a bag. 3,970,503, Cl. 156-323.000.

Yoshiura, Hirohisa; Arai, Toshiharu; Miyake, Masao; and Enriki, Kiyoshi, to Mitsubishi Chemical Industries Ltd. Pigment containing polyolefin composition. 3,970,632, Cl. 260-42.210.

Young, Patrick J.: *See*—
Glover, Clinton G.; Markley, Jack H.; and Young, Patrick J., 3,970,497.

Younger, Robert Dewitt: *See*—
Procter, Samuel Anderson; and Younger, Robert Dewitt, 3,970,925.

Yowell, Wayne Lester: *See*—
George, Douglas Franklin; and Yowell, Wayne Lester, 3,969,964.

Yulkowski, Leon. Door construction. 3,969,845, Cl. 49-394.000.

Zaborsky, Oskar R.; and Laskin, Allen I., to Exxon Research and Engineering Company. Immobilized glycoenzymes. 3,970,521, Cl. 195-63.000.

Zahn, Irwin, to General Staple Company, Inc. Method for applying designs to pierceable materials. 3,969,811, Cl. 29-417.000.

Zahnradfabrik Friedrichshafen Aktiengesellschaft: *See*—
Bucksch, Manfred, 3,970,176.

Zaloga, Peter P.: *See*—
Borucki, Eugene W.; and Zaloga, Peter P., 3,970,929.

Zamansky, Asher Z.; and Zamansky, Hyman H. Twister for wire ties. 3,970,117, Cl. 140-93.00A.

Zamansky, Hyman H.: *See*—
Zamansky, Asher Z.; and Zamansky, Hyman H., 3,970,117.

Zarka, Joseph, to SKF Compagnie d'Applications Mecaniques; and Anvar, Agence Nationale de Valorisation de la Recherche. Nondestructive testing method for determining a body's mechanical properties and stresses. 3,969,928, Cl. 73-88.00R.

Zellmer, Neale A., to GTE Automatic Electric Laboratories Incorporated. Negative DC to positive DC converter. 3,970,871, Cl. 307-262.000.

Zellweger, Jurg; and Fierz, Max, to Werkzeugmaschinenfabrik Oerlikon-Buhrle. Breechblock for automatic firing weapon. 3,969,983, Cl. 89-185.000.

Zellweger Uster AG: *See*—
Baumann, Eduard; and Waldispuhl, Candidus A., 3,970,898.

Zerrer, Gerhard, to Andreas Stihl Maschinenfabrik. Adjustable protective hood for a rotary tool. 3,969,856, Cl. 51-268.000.

Zickendraht, Christian: *See*—
Dengler, Siegfried; Loew, Peter; Zickendraht, Christian; and Schwander, Hansrudolf, 3,970,675.

Ziegler, Charles J.: *See*—
Mahaffey, James W.; and Ziegler, Charles J., 3,970,856.

Ziegler, Moses. Portable electric light device. 3,969,839, Cl. 43-17.600.

Zimmer, Erich, to Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung. Method of making spherical metallic oxide and metallic carbide particles. 3,970,580, Cl. 252-301.10S.

Zimmer, Peter. Dyestuff applicator for screen printer. 3,969,999, Cl. 101-120.000.

Zimmerman, Thomas H.: *See*—
Clark, Samuel A., Jr.; Lucey, George K., Jr.; and Zimmerman, Thomas H., 3,971,024.

Zirngiebl, Eberhard; and Irlenkauser, Alfred, to Bayer Aktiengesellschaft. Process for the purification of electrolysis brine. 3,970,528, Cl. 204-98.000.

Zoecon Corporation: *See*—
Henrick, Clive A.; and Siddall, John B., 3,970,704.

Zurheide, Manfred: *See*—
Dahmen, Manfred; Ritzhaupt, Anneliese; and Zurheide, Manfred, 3,970,487.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 20TH DAY OF JULY, 1976

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Automated Building Components, Inc.: *See*—
Jureit, John Calvin, Re. 28,908.

BRK Shareholders' Committee: *See*—
Ogden, Wilbur L.; and Henderson, Clarence Glenn, Re. 28,915.

Broken Hill Proprietary Company Limited, The: *See*—
Dalli, Alan George; Debenham, Michael; and Schackleford, Ralph Edward, Re. 28,910.

Bump, Edward L.: *See*—
Jespersen, Paul W.; and Bump, Edward L., Re. 28,911.

Cincinnati Milacron, Inc.: *See*—
Kelly, Ralph; and Ritter, Edmond Jean, Re. 28,913.

Dalli, Alan George; Debenham, Michael; and Schackleford, Ralph Edward, to Broken Hill Proprietary Company Limited, The. Push-in easy-opening closures. Re. 28,910, Cl. 113-121.00C.

Debenham, Michael: *See*—
Dalli, Alan George; Debenham, Michael; and Schackleford, Ralph Edward, Re. 28,910.

Deering Milliken Research Corporation: *See*—
Marco, Francis W., Re. 28,914.

Eibes, Carl B. H., deceased; by Eibes nee Waschau, Ursula, legal heir; by Eibes, Christian, legal heir; by Eibes, Carl-Herwig, legal heir; and by Wagner nee Eibes, Maria-Theresia, legal heir. Self-tapping threaded bushings. Re. 28,907, Cl. 85-47.000.

Eibes, Carl-Herwig, legal heir: *See*—
Eibes, Carl B. H., deceased; Eibes nee Waschau, Ursula, legal heir; Eibes, Christian, legal heir; Eibes, Carl-Herwig, legal heir; and Wagner nee Eibes, Maria-Theresia, legal heir, Re. 28,907.

Eibes, Christian, legal heir: *See*—
Eibes, Carl B. H., deceased; Eibes nee Waschau, Ursula, legal heir; Eibes, Christian, legal heir; Eibes, Carl-Herwig, legal heir; and Wagner nee Eibes, Maria-Theresia, legal heir, Re. 28,907.

Eibes nee Waschau, Ursula, legal heir: *See*—
Eibes, Carl B. H., deceased; Eibes nee Waschau, Ursula, legal heir; Eibes, Christian, legal heir; Eibes, Carl-Herwig, legal heir; and Wagner nee Eibes, Maria-Theresia, legal heir, Re. 28,907.

Georgia-Pacific Corporation: *See*—
Jespersen, Paul W.; and Bump, Edward L., Re. 28,911.

Henderson, Clarence Glenn: *See*—
Ogden, Wilbur L.; and Henderson, Clarence Glenn, Re. 28,915.

Hoglund, Edward: *See*—
Stade, Bertil; and Hoglund, Edward, Re. 28,912.

Holbert, Dimitry, to Standard Alliance Industries, Inc. Conveyor. Re. 28,909, Cl. 104-172.00B.

Indian Head Inc.: *See*—
McKinney, Donald W.; and Sinski, Henry A., Re. 28,906.

Jespersen, Paul W.; and Bump, Edward L., to Georgia-Pacific Corporation. Dispenser for flexible sheet material and a perforating mechanism adapted to be used therein. Re. 28,911, Cl. 225-96.000.

Jureit, John Calvin, to Automated Building Components, Inc. Fluid actuated press. Re. 28,908, Cl. 100-100.000.

Kelly, Ralph; and Ritter, Edmond Jean, to Cincinnati Milacron, Inc. Mildness additive. Re. 28,913, Cl. 252-547.000.

Marco, Francis W., to Deering Milliken Research Corporation. Treatment of a cellulosic-containing textile with a fluorocarbon, an aminoplast, and a synthetic acid copolymer, and textile obtained therefrom. Re. 28,914, Cl. 428-272.000.

McKinney, Donald W.; and Sinski, Henry A., to Indian Head Inc. Crimping apparatus with heating and cooling cage. Re. 28,906, Cl. 28-1.700.

Mercury Metal Products, Inc.: *See*—
Stade, Bertil; and Hoglund, Edward, Re. 28,912.

Ogden, Wilbur L.; and Henderson, Clarence Glenn, to BRK Shareholders' Committee. Detection of products of combustion. Re. 28,915, Cl. 340-237.00S.

Ritter, Edmond Jean: *See*—
Kelly, Ralph; and Ritter, Edmond Jean, Re. 28,913.

Schackleford, Ralph Edward: *See*—
Dalli, Alan George; Debenham, Michael; and Schackleford, Ralph Edward, Re. 28,910.

Sinski, Henry A.: *See*—
McKinney, Donald W.; and Sinski, Henry A., Re. 28,906.

Stade, Bertil; and Hoglund, Edward, to Mercury Metal Products, Inc. Emission-free exhaust pipe joint and clamp therefor. Re. 28,912, Cl. 285-367.000.

Standard Alliance Industries, Inc.: *See*—
Holbert, Dimitry, Re. 28,909.

Wagner nee Eibes, Maria-Theresia, legal heir: *See*—
Eibes, Carl B. H., deceased; Eibes nee Waschau, Ursula, legal heir; Eibes, Christian, legal heir; Eibes, Carl-Herwig, legal heir; and Wagner nee Eibes, Maria-Theresia, legal heir, Re. 28,907.

LIST OF PLANT PATENTEES

Jackson & Perkins Co.: *See*—
Warriner, William A. 3,937.

Warriner, William A., to Jackson & Perkins Co. Rose plant. 3,937, 7–20–76, Cl. 29.

LIST OF DESIGN PATENTEES

Abbott Laboratories: *See*—
D'Alo, Herbert F. 240,668.

Acorn Engineering: *See*—
Morris, Earl L. 240,627.

Adee, Ray A.: *See*—
White, Allen A., Adee, Knopp, and White. 240,648.

Advent Corp.: *See*—
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American Greetings Corp.: *See*—
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Araki, Minoi, to Yorx Corp. Combined phonograph, radio and cartridge recorder and player. 240,659, 7–20–76, Cl. D56—4.

Armco Steel Corp.: *See*—
Baker, William J. 240,626.

Anderson, Frank R., and A. J. Castro, to Westates Space-Era Products, Inc. Flushing valve for an irrigation system. 240,625, 7–20–76, Cl. D23—19.

Ashworth, Theodore L. Wrist watch strap. 240,649, 7–20–76, Cl. D45—4.

Baker, William J., to Armco Steel Corp. Ball valve. 240,626, 7–20–76, Cl. D23—19.

Bartley, Francis A.: *See*—
Thomas, Richard L., Lewis, Bartley, Myers, and Goodbary. 240,613.

Becker, Harry C. Weight. 240,612, 7–20–76, Cl. D10—94.

Bevelacqua, Philip K.: *See*—
Ostborg, Jan N., Bevelacqua, and Hirsch. 240,581.

Bohomoletz, Michael. Stand for potted plants and the like. 240,583, 7–20–76, Cl. D6—183.

Bower, John, to American Greetings Corp. Storage cabinet for magnetic tapes or other similar articles. 240,579, 7–20–76, Cl. D6—149.

Brion, Mary L. Quilted fabric applique block. 240,573, 7–20–76, Cl. D33—9.

Brown, Frank E., to Smithkline Corp. Metered dispensing container. 240,596, 7–20–76, Cl. D9—169.

Bussey, Harry, Jr. Loose fill packing element. 240,603, 7–20–76, Cl. D9—294.

Bussey, Harry, Jr. Loose fill packing element. 240,604, 7–20–76, Cl. D9—294.

Capehart Corp.: *See*—
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Carbon, Fred S. Waffle baker or similar article. 240,586, 7–20–76, Cl. D7—88.

Carter, Ronald D.: *See*—
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Anderson, Frank R., and Castro. 240,625.

Chance, A. B., Co.: *See*—
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Cless, Gerhard: *See*—
Kaplan, Edward L., and Cless. 240,585.

Colgate-Palmolive Co.: *See*—
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Newman, Fred C. 240,602.
Cooper, Lonnie D., to Revell, Inc. Rotatable locking joint. 240,589, 7–20–76, Cl. D8—108.
Cope, Raymond. Dental arm rest cabinet. 240,629, 7–20–76, Cl. D24—1.
Covert, Douglas C., to Xerox Corp. Conductor educational board. 240,618, 7–20–76, Cl. D19—62.
Cowan, Murray L., to Textron Inc. Expansible link chain for a bracelet or similar article. 240,650, 7–20–76, Cl. D45—4.
Cowan, Murray L., to Textron Inc. Chain for a bracelet or similar article. 240,651, 7–20–76, Cl. D45—4.
D'Alo, Herbert F., to Abbott Laboratories. Vacuum device for an expandable container. 240,668, 7–20–76, Cl. D83—1.
Dobashi, Takaaki, and T. Kurokawa, to Fuji Electric Co., Ltd. Cash register. 240,654, 7–20–76, Cl. D52—4.
Docutel Corp. of Dallas, Texas: *See*—
Haufler, Herbert H., Watson, and McCauley. 240,633.
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Eaton Corp.: *See*—
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Educational Design Associates: *See*—
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Root, Charles B. 240,647.
Eftekhar, Zia, to Lightolier Inc. Lighting fixture. 240,653. 7–20–76, Cl. D48—23.
Electronic Data Controls Corp.: *See*—
Clark, Robert E., and Harris. 240,640.
Franzen, Hans, and J. Lind, to Sandvik Aktiebolag. Abrader. 240,587, 7–20–76, Cl. D8—90.
Franzen, Hans, and J. Lind, to Sandvik Aktiebolag. Abrader. 240,588, 7–20–76, Cl. D8—90.
Freivokh, Kenneth: *See*—
Hobden, Nigel M., Freivokh, Taylor, Carter, and Gale. 240,638.
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Fujiwara, Tomio, to Matsushita Electric Industrial Co., Ltd. Digital clock radio. 240,661, 7–20–76, Cl. D56—4.
Gale Electronics & Design Ltd.: *See*—
Hobden, Nigel M., Freivokh, Taylor, Carter, and Gale. 240,638.
Gale, Ira D.: *See*—
Hobden, Nigel M., Freivokh, Taylor, Carter, and Gale. 240,638.
Gasowski, Chester J., D. B. Granger, J. A. Hutz, and T. M. Ruip, to The Goodyear Tire & Rubber Co. Tire. 240,616, 7–20–76, Cl. D12—146.
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Thomas, Richard L., Lewis, Bartley, Myers, and Goodbary. 240,613.
Goodwin, William J., to Pye Ltd. Medicine cabinet. 240,576, 7–20–76, Cl. D6—104.
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Gasowski, Chester J., Granger, Hutz, and Ruip. 240,616.
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Haufler, Herbert H., T. P. Watson, and E. H. McCauley, to Docutel Corp. of Dallas, Texas. Banking machine terminal. 240,633, 7–20–76, Cl. D26—5.
Haupt, Linda, to General Mills Fun Group, Inc. Doll. 240,641, 7–20–76, Cl. D34—4.
Hazama, Shigetoshi, to Sharp Kabushiki Kaisha. Electronic calculating machine. 240,634, 7–20–76, Cl. D26—5.
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White, Allen A., Adee, Knopp, and White. 240,648.
Hirsch, Richard L.: *See*—
Ostborg, Jan N., Bevelacqua, and Hirsch. 240,581.
Hobden, Nigel M., K. Freivokh, M. Taylor, R. D. Carter, and I. D. Gale, to Gale Electronics & Design Ltd. Record turntable unit. 240,638, 7–20–76, Cl. D26—14.
Holcomb, Jack N., to National Intelligence Academy. Battery overload educational board. 240,619, 7–20–76, Cl. D19—64.
Holcomb, Jack N., to National Intelligence Academy. Audiofilter educational board. 240,620, 7–20–76, Cl. D19—64.
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Iami, Shogo, to Sharp Kabushiki Kaisha. Clock radio. 240,656, 7–20–76, Cl. D56—4.
Isaacs, Harold. Stud setter. 240,598, 7–20–76, Cl. D8—47.
Kalvitis, Robert E., and D. A. Robertson, to Xerox Corp. Cabinet for electronic equipment. 240,632, 7–20–76, Cl. D26—5.
Kaplan, Edward L., and G. Cless, to Kenneth H. Gutner. Guide for a drawer. 240,585, 7–20–76, Cl. D6—191.
Kapustin, Alexander T. Heating stove. 240,628, 7–20–76, Cl. D23—93.
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Kleeh, David C., C. W. Roberts, W. M. Hopkins, and J. D. Glenn, to The Goodyear Tire & Rubber Co. Tire. 240,615, 7–20–76, Cl. D12—142.
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Koenigsberg, Victor, to Colgate-Palmolive Co. Bottle. 240,594, 7–20–76, Cl. D9—143.
Kramer, Jochen, C. Prochnow, and R. Sobotta, to Rollei-Werke Franke & Heidecke. Sound projector. 240,665, 7–20–76, Cl. D16—21.
Kress, Elmer E. Container closure. 240,595, 7–20–76, Cl. D9—164.
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Newman, Fred C., to Continental Can Co., Inc. Container end panel. 240,602, 7–20–76, Cl. D9—253.
Newman, Fred D. Support for garden tools or the like. 240,577, 7–20–76, Cl. D6—114.
O'Neil, Robert A., to The Seeburg Corp. of Delaware. Speaker cabinet. 240,637, 7–20–76, Cl. D26—14.
Ostborg, Jan N., P. K. Bevelacqua, and R. L. Hirsch, to Harvard Industries, Inc. Work station. 240,581, 7–20–76, Cl. D6—161.
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[illegible]

Newman, Fred C., to Continental Can Co., Inc. Container end panel. 240,003. 7-20-76. Cl. D9—328.

[illegible]

O'Neil, Robert A., to The Seeburg Corp. [illegible]

Osborn, Jan P., P. K. Pavelka, and H. T. Hirsch, to Lion [illegible] Industries, Inc. [illegible] 240,381. [illegible]

[illegible]

CLASSIFICATION OF PATENTS

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303 3,970,514
360R 3,970,515
382 3,970,516

CLASS 164

4 3,970,135
108 3,970,136
160 3,970,137
244 3,970,138
253 3,970,139

CLASS 165

45 3,970,140
47 3,970,141
163 3,970,142

CLASS 166

53 3,970,143
3,970,144
188 3,970,145
249 3,970,146
250 3,970,147
307 3,970,148

CLASS 168

25 3,970,149

CLASS 171

56 3,970,150

CLASS 173

12 3,970,151
15 3,970,152
17 3,970,153
24 3,970,154

CLASS 174

53 3,970,772

CLASS 175

6 3,970,156
22 3,970,157
410 3,970,158

CLASS 176

66 3,970,517

CLASS 177

123 3,970,159

CLASS 178

5.8R 3,970,773
6 3,970,774
6.8 3,970,775
3,970,776
7.1 3,970,777
3,970,778
7.3R 3,970,779
7.6 3,970,781
7.9 3,970,782
46 3,970,783
58A 3,970,784

CLASS 179

1AT 3,970,787
1GQ 3,970,788
1HS 3,970,789
1VC 3,970,786
1N 3,970,785
1.5S 3,970,790
3,970,791
2TV 3,970,792
7.1R 3,970,793
15AF 3,970,796
3,970,798
15AQ 3,970,794
15AT 3,970,797
15BF 3,970,795
15BY 3,970,799
18AD 3,970,800
41A 3,970,801
98 3,970,802
100.3B 3,970,803
131 3,970,804
170NC 3,970,805

CLASS 180

6.5 3,970,160
54A 3,970,161
64R 3,970,162
65A 3,970,163
68R 3,970,164
155 3,970,165
163 3,970,166

CLASS 181

58 3,970,167
60 3,970,168

CLASS 182

1 3,970,169
230 3,970,170

CLASS 187

9E 3,970,171

CLASS 188

73.4 3,970,172
203 3,970,173
251A 3,970,174

CLASS 192

22 3,970,175
87.11 3,970,176
91A 3,970,177
105BA 3,970,178
138 3,970,179

CLASS 193

35A 3,970,180

CLASS 194

63 3,970,181
84 3,970,182

CLASS 195

1.5 3,970,518
29 3,970,519
3,970,520
63 3,970,521
112 3,970,522

CLASS 197

1R 3,970,183
3,970,184
9 3,970,185
54 3,970,186

CLASS 198

16R 3,970,187
30 3,970,188
34 3,970,189
189 3,970,190
219 3,970,191
230 3,970,192

CLASS 200

5R 3,970,806
34 3,970,807
50A 3,970,808
144B 3,970,809
3,970,810
148A 3,970,811
307 3,970,812

CLASS 201

1 3,970,523
2.5 3,970,524

CLASS 202

174 3,970,525
227 3,970,526

CLASS 204

9 3,970,527
98 3,970,528
129.9 3,970,529
149 3,970,531
158R 3,970,532
159.14 3,970,533
159.17 3,970,534
159.18 3,970,535
180R 3,970,536
211 3,970,537
224M 3,970,538
254 3,970,539
297W 3,970,540

CLASS 206

104 3,970,193
228 3,970,194
380 3,970,195

CLASS 208

8 3,970,541
22 3,970,542
86 3,970,543
111 3,970,544
212 3,970,545

CLASS 209

3 3,970,546
136 3,970,547
240 3,970,548
341 3,970,549
399 3,970,550
458 3,970,551

CLASS 210

19 3,970,552
36 3,970,553
62 3,970,554
80 3,970,555
83 3,970,556
130 3,970,557
138 3,970,558
166 3,970,559
167 3,970,560
198C 3,970,561
205 3,970,562
237 3,970,563
323R 3,970,564
359 3,970,565
452 3,970,566

CLASS 211

5 3,970,196
3,970,197
41 3,970,198
128 3,970,199

CLASS 214

1BT 3,970,201
1H 3,970,200
6.5 3,970,202
85.1 3,970,203
339 3,970,204
652 3,970,205

CLASS 215

11R 3,970,206
296 3,970,207

CLASS 219

10.57 3,970,813
76 3,970,814
98 3,970,815
121LM 3,970,819
205 3,970,816
209 3,970,817
210 3,970,818
271 3,970,820
523 3,970,821
541 3,970,822
546 3,970,823

CLASS 220

3 3,970,208
6 3,970,209
9LG 3,970,210
267 3,970,211
269 3,970,212
324 3,970,213

CLASS 221

1 3,970,214
45 3,970,215
80 3,970,217
125 3,970,216
157 3,970,218

CLASS 222

1 3,970,219
102 3,970,220
145 3,970,221
148 3,970,222
306 3,970,223
370 3,970,224
529 3,970,225

CLASS 223

37 3,970,226

CLASS 224

5H 3,970,228
5R 3,970,227
31 3,970,229

CLASS 225

65 3,970,230
96 Re.28,911

CLASS 226

7 3,970,231

CLASS 228

3,970,232
3,970,233
20 3,970,234
122 3,970,235
196 3,970,236
207 3,970,238
208 3,970,237
220 3,970,239

CLASS 229

22 3,970,240
58 3,970,241
80 3,970,242

CLASS 233

19R 3,970,243
22 3,970,244
24 3,970,245

CLASS 235

61.11C 3,970,826
61.11E 3,970,825
61.11H 3,970,824
92TC 3,970,827
92T 3,970,828
150.22 3,970,829
151.1 3,970,831
151.11 3,970,830
151.3 3,970,832
175 3,970,833

CLASS 236

44C 3,970,246

CLASS 237

12.3B 3,970,247

CLASS 238

349 3,970,248

CLASS 239

102 3,970,249
3,970,250
107 3,970,251
127.3 3,970,252
265.19 3,970,253

CLASS 240

1.3 3,970,835
10Q 3,970,834
41R 3,970,836
52.15 3,970,837

CLASS 241

1 3,970,254
186R 3,970,255
231 3,970,256
275 3,970,257
282.1 3,970,258

CLASS 242

7.08 3,970,259
18DD 3,970,260
55 3,970,261
68.3 3,970,262
84.2A 3,970,263
96 3,970,264
107.4A 3,970,265
107.4R 3,970,266
115 3,970,267
3,970,268

CLASS 244

3.16 3,970,269
5 3,970,270

CLASS 246

34R 3,970,271

CLASS 248

9 3,970,272
24 3,970,273
185 3,970,274
223 3,970,275
3,970,276
246 3,970,277
352 3,970,278

CLASS 249

96 3,970,279

CLASS 250

199 3,970,838
3,970,839
201 3,970,841
3,970,842
202 3,970,840
211J 3,970,843
213VT 3,970,844
214R 3,970,845
221 3,970,846
234 3,970,847
252 3,970,848
281 3,970,849
352 3,970,850
3,970,851
363S 3,970,852
3,970,853
492A 3,970,854
493 3,970,855
3,970,856
533 3,970,567
563 3,970,857

CLASS 251

58 3,970,280
77 3,970,281
129 3,970,282
144 3,970,283
149.9 3,970,284
214 3,970,285

CLASS 252

48.6 3,970,568
49.3 3,970,569
49.9 3,970,570
62.1P 3,970,571
62.9 3,970,572
73 3,970,573
79 3,970,574
95 3,970,575
106 3,970,576
182 3,970,577
186 3,970,578
299 3,970,579
301.1R 3,970,581
301.1S 3,970,580
301.1S 3,970,583
301.6S 3,970,582
305 3,970,584
316 3,970,585
355 3,970,586
417 3,970,587
459 3,970,588
466PT 3,970,589
514 3,970,590
521 3,970,591
522 3,970,592
3,970,593
524 3,970,594
545 3,970,595
546 3,970,596
547 Re.28,913

CLASS 254

134.3R 3,970,286
190R 3,970,287

CLASS 259

7 3,970,288
103 3,970,289

CLASS 260

2.5AD 3,970,618
2.5AN 3,970,619
2.5P 3,970,620
18EP 3,970,621
23XA 3,970,622
3,970,644
27BB 3,970,623
28.5A 3,970,624
29.4R 3,970,625
29.6NR 3,970,628
29.6WB 3,970,626
29.6F 3,970,627
29.7T 3,970,629
30.2 3,970,630
31.6 3,970,631
42.21 3,970,632
42.29 3,970,633
45.7S 3,970,634
45.75N 3,970,638
45.8NE 3,970,636
45.8R 3,970,635
45.85A 3,970,639
45.9NC 3,970,637
47ET 3,970,640
72N 3,970,597
75S 3,970,598
77.5CH 3,970,599
77.5NC 3,970,600
77.5Q 3,970,601
78.41 3,970,602
79.3M 3,970,604
3,970,605
123.7 3,970,614
145B 3,970,615
147 3,970,616
152 3,970,617
239.3D 3,970,645
239.55D 3,970,646
240A 3,970,648
240B 3,970,647
3,970,650
240G 3,970,649
243C 3,970,651
244R 3,970,652
247.1E 3,970,653
251QB 3,970,654
290P 3,970,655
293.8 3,970,656
294.9 3,970,657
3,970,658
3,970,659
295L 3,970,660
295.5A 3,970,661
3,970,663
295.5R 3,970,662
296T 3,970,664
307DA 3,970,665
308B 3,970,667
308R 3,970,666
309.2 3,970,668
309.5 3,970,669
332.2A 3,970,670
335 3,970,671
340.5 3,970,672
343.3R 3,970,673
346.2R 3,970,674
364 3,970,675
397.2 3,970,676
404.5 3,970,677
429.7 3,970,678
3,970,679
453SP 3,970,680
465F 3,970,681
468D 3,970,683
3,970,684
468K 3,970,682
470 3,970,685
476C 3,970,686
482C 3,970,687
484R 3,970,688
488F 3,970,689
505C 3,970,690
507R 3,970,691
514D 3,970,692
515A 3,970,693
520C 3,970,694
524R 3,970,696
533R 3,970,697
534R 3,970,695
535P 3,970,698
562R 3,970,699
570.8R 3,970,700
601R 3,970,701
604R 3,970,702
611A 3,970,703
614R 3,970,704
3,970,705
617F 3,970,706
620 3,970,707
624C 3,970,708
633 3,970,710
635C 3,970,712
635E 3,970,711
638R 3,970,713
683.62 3,970,720
683.63 3,970,721
827 3,970,709
857PE 3,970,714
859R 3,970,715
3,970,716
3,970,717
876R 3,970,718
878B 3,970,719
878R 3,970,722
880R 3,970,723
894 3,970,724
901 3,970,725
927R 3,970,726
932 3,970,727
949 3,970,728
978 3,970,729

CLASS 261

41D 3,970,730
122 3,970,731

CLASS 264

40.5 3,970,732
135 3,970,733
219 3,970,734
272 3,970,735
310 3,970,736

CLASS 266

138 3,970,290
193 3,970,291

CLASS 267

31 3,970,293
64R 3,970,292
161 3,970,294

CLASS 269

17 3,970,295
32 3,970,296

CLASS 270

58 3,970,297

CLASS 271

34 3,970,298
250 3,970,299

CLASS 272

56.5R 3,970,300
113 3,970,301
130 3,970,302

CLASS 273

1R 3,970,303
1.5R 3,970,304
54B 3,970,305
85F 3,970,306
86B 3,970,309
95A 3,970,308
95R 3,970,307
101 3,970,311
102.2R 3,970,310
130A 3,970,312
134AD 3,970,313
156 3,970,314
161 3,970,315
189R 3,970,316

CLASS 274

105 3,970,317

CLASS 277

26 3,970,318
53 3,970,319
74 3,970,320

188A 3,970,321
235A 3,970,322

CLASS 279
64 3,970,323

CLASS 280
87.02W 3,970,325
301 3,970,330
610 3,970,324
626 3,970,326
683 3,970,327
731 3,970,328
733 3,970,329

CLASS 281
21R 3,970,331
31 3,970,332

CLASS 285
9R 3,970,333
30 3,970,334
133A 3,970,335
341 3,970,336
342 3,970,337
367 Re.28,912

CLASS 289
1.5 3,970,338

CLASS 290
14 3,970,858
54 3,970,859

CLASS 292
227 3,970,339
300 3,970,340

CLASS 294
64R 3,970,341
86R 3,970,342

CLASS 296
137E 3,970,343

CLASS 297
189 3,970,344
195 3,970,345

CLASS 301
37R 3,970,346

CLASS 303
6C 3,970,347
22R 3,970,348

CLASS 307
10LS 3,970,860
35 3,970,861
88ET 3,970,862
116 3,970,863
141 3,970,864
218 3,970,865
3,970,866
225R 3,970,867
232 3,970,868
251 3,970,869
261 3,970,870
262 3,970,871
265 3,970,872
276 3,970,873
293 3,970,874
304 3,970,875
310 3,970,876

CLASS 310
8.3 3,970,877
8.6 3,970,878
9.1 3,970,879
9.4 3,970,880
68D 3,970,881
245 3,970,882

CLASS 312
268 3,970,349

CLASS 313
39 3,970,883
55 3,970,884
141 3,970,885
223 3,970,886
309 3,970,887
346R 3,970,888
396 3,970,889
413 3,970,890

CLASS 315
3.5 3,970,891
111.3 3,970,892
293 3,970,893
370 3,970,894
381 3,970,895
387 3,970,896

CLASS 317
13R 3,970,897
25 3,970,898
31 3,970,900
33R 3,970,899
49 3,970,901
120 3,970,902
230 3,970,903
258 3,970,904
262E 3,970,905

CLASS 318
7 3,970,906
207C 3,970,907
221E 3,970,908
341 3,970,909
576 3,970,910
607 3,970,911

CLASS 320
2 3,970,912
48 3,970,913

CLASS 321
2 3,970,914
21 3,970,915
27R 3,970,916

CLASS 322
4 3,970,917

CLASS 323
6 3,970,918
19 3,970,919

CLASS 324
32 3,970,920
34L 3,970,921
45 3,970,922
54 3,970,924
57Q 3,970,925
57R 3,970,926
64 3,970,923
67 3,970,927
71CP 3,970,928
73R 3,970,929
98 3,970,930
99R 3,970,931
133 3,970,932
3,970,933
158F 3,970,934
166 3,970,935

CLASS 325
26 3,970,936
49 3,970,937
117 3,970,938
185 3,970,939
363 3,970,940

CLASS 328
41 3,970,941
133 3,970,942
151 3,970,943
162 3,970,944

CLASS 329
104 3,970,945
3,970,946

CLASS 330
23 3,970,947
29 3,970,948
3,970,949
30D 3,970,950
3,970,951
45 3,970,952
99 3,970,953

CLASS 331
53 3,970,954
94.5PE 3,970,956
3,970,961
3,970,962
94.5C 3,970,958
3,970,959
3,970,963
94.5F 3,970,960
94.5G 3,970,955
3,970,957
3,970,964
3,970,965
107S 3,970,966
116R

CLASS 332
7.51 3,970,967
37D 3,970,968

CLASS 333
12 3,970,969
72 3,970,970
81R 3,970,971
82BT 3,970,972
97R 3,970,973

CLASS 334
45 3,970,974

CLASS 335
18 3,970,975
21 3,970,976
132 3,970,977
203 3,970,978
229 3,970,979
253 3,970,980
266 3,970,981
284 3,971,054

CLASS 338
4 3,970,982
9 3,970,983
153 3,970,984
162 3,970,985
171 3,970,986

CLASS 339
18P 3,970,350
49R 3,970,351
59M 3,970,352
75MP 3,970,353
113R 3,970,354
177R 3,970,355
252P 3,970,356

CLASS 340
15 3,970,987
43 3,970,988
146.1AG 3,970,989
146.3AC 3,970,991
146.3F 3,970,990
172.5 3,970,992
3,970,993
3,970,994
3,970,995
3,970,996
3,970,997
3,970,998
3,971,000
173FF 3,971,004
173LT 3,971,002
173R 3,971,001
3,971,003
174TF 3,971,005
3,971,037
3,971,038
224 3,971,006
237S Re.28,915
255 3,971,007
267C 3,971,008
276 3,971,009
310R 3,971,010
324A 3,971,011
336 3,971,012
337 3,971,013
347AD 3,971,015
347DD 3,971,014
384E 3,971,016
3,971,017

CLASS 343
5CD 3,971,018
7.4 3,971,019
7.9 3,971,020
18E 3,971,021
108M 3,971,026
108R 3,971,025
113R 3,971,027
225 3,971,028
704 3,971,029
713 3,971,030
744 3,971,031
754 3,971,022
770 3,971,032
840 3,971,023
872 3,971,024

CLASS 346
1 3,971,033
3,971,034
33TP 3,971,035
75 3,971,039
3,971,040
76R 3,971,041
139C 3,971,036
3,971,042

CLASS 350
3.5 3,970,357
3,970,358
7 3,970,359
96WG 3,970,360
144 3,970,361
155 3,970,362
160LC 3,970,363
160R 3,970,364
3,970,365
184 3,970,366
3,970,367
187 3,970,368
202 3,970,369
255 3,970,370
273 3,970,371
274 3,970,372
285 3,970,373
301 3,970,374
312 3,970,375

CLASS 351
35 3,970,376

CLASS 352
14 3,970,377
30 3,970,378
52 3,970,379
130 3,970,380

CLASS 354
1 3,971,043
9 3,971,044
23R 3,971,045
24 3,971,046
50 3,971,047
60L 3,971,048
127 3,971,049
128 3,971,050
201 3,971,051
219 3,971,052
234 3,971,053

CLASS 355
3R 3,970,381
4 3,970,382
3,970,383
14 3,970,384
50 3,970,385
111 3,970,386

CLASS 356
51 3,970,387
72 3,970,388
106R 3,970,389
109 3,970,390
152 3,970,391
179 3,970,392
195 3,970,393
3,970,394

CLASS 357
22 3,971,055
28 3,971,056
30 3,971,057
36 3,971,058
44 3,971,059
51 3,971,060
52 3,971,061
70 3,971,062

CLASS 358
8 3,971,063
38 3,971,064
41 3,971,065
55 3,971,066
74 3,971,067
82 3,971,068

CLASS 360
16 3,971,069
3,971,070
132 3,971,071

CLASS 401
1 3,970,395
208 3,970,396

CLASS 402
79 3,970,397

CLASS 403
26 3,970,398
231 3,970,399
242 3,970,400
265 3,970,401
338 3,970,402

CLASS 404
27 3,970,403
77 3,970,404
105 3,970,405

CLASS 408
127 3,970,406
204 3,970,407

CLASS 415
60 3,970,408

CLASS 416
145 3,970,409
154 3,970,410
178 3,970,411
219R 3,970,412

CLASS 417
7 3,970,413
252 3,970,414
332 3,970,415

CLASS 423
23S 3,970,739
27 3,970,737
140 3,970,738
242 3,970,740
321S 3,970,741
365 3,970,742
574R 3,970,743
3,970,744
657 3,970,745

CLASS 424
1.5 3,970,746
52 3,970,747
68 3,970,748
85 3,970,749
153 3,970,750
200 3,970,751
249 3,970,752
263 3,970,753
267 3,970,754
270 3,970,755
273 3,970,756
274 3,970,757
278 3,970,758
343 3,970,759
346 3,970,760

CLASS 425
52 3,970,416
72S 3,970,417
140 3,970,418
242B 3,970,419

CLASS 426
237 3,970,530
250 3,970,761
287 3,970,762
324 3,970,763
430 3,970,764
534 3,970,765
3,970,766
579 3,970,767

CLASS 427
50 3,970,768
145 3,970,769

CLASS 428
272 Re.28,914
379 3,970,770
425 3,970,771

CLASS 431
255 3,970,420

CLASS 432
11 3,970,421

CLASS 526
12 3,970,603
19 3,970,608
62 3,970,610
65 3,970,611
86 3,970,612
89 3,970,609
104 3,970,613
260 3,970,606
335 3,970,607

CLASS 536
17 3,970,641
3,970,642
3,970,643

D2—	282	240,570		90	240,587	D10—	38	240,605		88	240,621		14D	240,638	D48—	16A	240,652
	361	240,571			240,588		46	240,606		99	240,622		G	240,637		23R	240,653
	400	240,572		108	240,589		57	240,607	D22—	27	240,623	D27—	8	240,639	D52—	4A	240,654
D6—	70	240,574		114	240,590		71	240,608	D23—	3	240,624	D31—	1	240,640	D56—	B	240,655
	76	240,575		271	240,599		78	240,609		19	240,625	D33—	9D	240,573			240,656
	104	240,576	D9—	1	240,591			240,610			240,626	D34—	4R	240,641			240,657
	114	240,577		61	240,592			240,611		49	240,627		5GH	240,642			240,661
	144	240,578		116	240,593		94	240,612		93	240,628			240,643			240,662
	149	240,579		143	240,594	D12—	15	240,613	D24—	1B	240,629			240,644			240,663
	150	240,580		164	240,595		33	240,614	D25—	10	240,617		11R	240,645		D	240,658
	161	240,581		169	240,596		142	240,615	D26—	1A	240,631		15M	240,646			240,666
	177	240,582		219	240,597		146	240,616		R	240,630			240,647		R	240,659
	183	240,583		231	240,600	D16—	2	240,664		5C	240,632	D40—	1E	240,648			240,660
	186	240,584		253	240,601		21	240,665			240,633	D45—	4	240,649	D83—	1C	240,667
	191	240,585			240,602	D19—	62	240,618			240,634			240,650		F	240,668
D7—	88	240,586		294	240,603		64	240,619			240,635			240,651	D86—	A	240,669
D8—	47	240,598			240,604			240,620		13R	240,636						

CLASSIFICATION OF PLANTS

P. —	29	3,937															

GEOGRAPHICAL INDEX OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)

Alabama	1	Kentucky	21	Oregon	41
Alaska	2	Louisiana	22	Pennsylvania	42
American Samoa	3	Maine	23	Puerto Rico	43
Arizona	4	Maryland	24	Rhode Island	44
Arkansas	5	Massachusetts	25	South Carolina	45
California	6	Michigan	26	South Dakota	46
Canal Zone	7	Minnesota	27	Tennessee	47
Colorado	8	Mississippi	28	Texas	48
Connecticut	9	Missouri	29	Utah	49
Delaware	10	Montana	30	Vermont	50
District of Columbia	11	Nebraska	31	Virginia	51
Florida	12	Nevada	32	Virgin Islands	52
Georgia	13	New Hampshire	33	Washington	53
Guam	14	New Jersey	34	West Virginia	54
Hawaii	15	New Mexico	35	Wisconsin	55
Idaho	16	New York	36	Wyoming	56
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Indiana	18	North Dakota	38	U.S. Army	58
Iowa	19	Ohio	39	U.S. Navy	59
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(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

PATENTS

1 : 3,969,828	3,970,316	3,970,958	3,969,799	3,969,954	3,970,937
3,970,988	3,970,320	3,970,959	3,969,847	3,969,955	3,970,966
2 : 3,970,247	3,970,330	3,970,962	3,969,922	3,969,961	3,970,974
4 : 3,970,251	3,970,331	3,970,963	3,970,430	3,969,975	3,970,986
3,970,284	3,970,345	3,970,964	3,970,574	3,970,013	3,971,007
3,970,307	3,970,351	3,970,990	3,970,590	3,970,023	3,971,040
3,970,681	3,970,359	3,970,992	3,970,617	3,970,033	18 : 3,969,825
3,971,059	3,970,386	3,970,993	3,970,668	3,970,039	3,969,890
5 : 3,970,182	3,970,389	3,971,010	3,970,857	3,970,059	3,969,892
6 : 3,969,777	3,970,390	3,971,015	11 : 3,969,824	3,970,071	3,969,898
3,969,781	3,970,397	3,971,020	3,970,789	3,970,086	3,969,918
3,969,782	3,970,407	3,971,023	12 : Re.28,908	3,970,103	3,969,950
3,969,786	3,970,431	3,971,025	3,969,829	3,970,105	3,970,051
3,969,788	3,970,474	3,971,035	3,969,832	3,970,181	3,970,134
3,969,804	3,970,488	3,971,038	3,969,849	3,970,199	3,970,226
3,969,814	3,970,495	3,971,044	3,969,863	3,970,204	3,970,235
3,969,818	3,970,531	3,971,058	3,969,923	3,970,211	3,970,317
3,969,821	3,970,556	8 : 3,969,812	3,969,925	3,970,217	3,970,319
3,969,830	3,970,558	3,969,870	3,970,005	3,970,237	3,970,537
3,969,836	3,970,568	3,970,088	3,970,031	3,970,238	3,970,560
3,969,842	3,970,570	3,971,032	3,970,069	3,970,285	3,970,723
3,969,857	3,970,575	9 : Re.28,911	3,970,078	3,970,312	3,970,727
3,969,895	3,970,581	3,969,803	3,970,080	3,970,327	3,970,732
3,969,907	3,970,631	3,969,810	3,970,156	3,970,352	3,970,773
3,969,909	3,970,685	3,969,820	3,970,213	3,970,385	3,970,806
3,969,929	3,970,704	3,969,848	3,970,216	3,970,417	3,970,864
3,969,936	3,970,708	3,969,914	3,970,219	3,970,445	3,970,895
3,969,962	3,970,735	3,969,926	3,970,261	3,970,448	3,971,041
3,969,963	3,970,743	3,969,960	3,970,340	3,970,489	3,971,064
3,969,964	3,970,744	3,969,966	3,970,354	3,970,493	3,971,067
3,969,978	3,970,758	3,969,992	3,970,392	3,970,515	19 : 3,969,868
3,970,002	3,970,777	3,970,035	3,970,427	3,970,545	3,969,896
3,970,030	3,970,778	3,970,090	3,970,527	3,970,557	3,970,045
3,970,036	3,970,791	3,970,298	3,970,546	3,970,563	3,970,057
3,970,082	3,970,820	3,970,362	3,970,801	3,970,595	3,970,342
3,970,089	3,970,824	3,970,412	3,970,902	3,970,611	20 : 3,969,864
3,970,100	3,970,828	3,970,418	3,970,938	3,970,642	3,970,108
3,970,150	3,970,831	3,970,439	3,970,970	3,970,658	3,970,334
3,970,155	3,970,835	3,970,505	3,971,006	3,970,683	3,970,652
3,970,192	3,970,838	3,970,506	3,971,054	3,970,686	3,970,720
3,970,193	3,970,844	3,970,532	13 : 3,969,780	3,970,698	3,970,761
3,970,195	3,970,865	3,970,538	3,970,614	3,970,710	21 : 3,970,091
3,970,198	3,970,871	3,970,540	15 : 3,969,802	3,970,782	3,970,440
3,970,207	3,970,883	3,970,549	17 : Re.28,912	3,970,788	3,970,697
3,970,227	3,970,892	3,970,716	Re.28,915	3,970,818	22 : 3,969,877
3,970,228	3,970,893	3,970,726	3,969,793	3,970,821	3,970,424
3,970,236	3,970,918	3,970,792	3,969,806	3,970,837	24 : 3,969,775
3,970,269	3,970,919	3,970,803	3,969,835	3,970,861	3,969,827
3,970,278	3,970,923	3,971,036	3,969,872	3,970,880	3,969,977
3,970,293	3,970,934	10 : Re.28,906	3,969,897	3,970,929	3,970,094
3,970,296	3,970,952	3,969,776	3,969,948	3,970,936	3,970,160

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1	240,629		240,627	17	240,578		240,647	36	240,580	39	240,591
6	240,570		240,628		240,581	25	240,650		240,592		240,615
	240,572		240,631		240,584		240,651		240,593		240,616
	240,589		240,642		240,585	26	240,586		240,594		240,635
	240,596		240,643		240,600		240,618		240,598		240,641
	240,607		240,644		240,601		240,623		240,599	40	240,577
	240,609		240,653		240,602	29	240,636		240,604		240,613
	240,610		240,667		240,637	33	240,658		240,605	41	240,622
	240,611	9	240,571		240,668	34	240,582		240,612	42	240,573
	240,621		240,595	18	240,649		240,583		240,632	48	240,606
	240,624	12	240,619	19	240,614		240,590		240,666		240,633
	240,625		240,620	20	240,648		240,603	37	240,579		240,669
	240,626	13	240,617	24	240,646		240,660		240,640		

PLANT PATENTS

6	3,937										

U. S. GOVERNMENT PRINTING OFFICE : O - 1978

U.S. DEPARTMENT OF COMMERCE
Elliot L. Richardson, Secretary

PATENT AND TRADEMARK OFFICE
C. Marshall Dann, *Commissioner*